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PROCEEDINGS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION

AT THE

FORTY-SECOND ANNUAL MEETING,

HELD AT

ASHEVILLE, N. C., SEPTEMBER, 1894.

ALSO THE

CONSTITUTION, BY-LAWS AND ROLL OF MEMBERS.

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INITIAL MEETING AT NEW YORK 1851.
AMERICAN
PHARMACEUTICAL
ASSOCIATION
INCORPORATED AT
WASHINGTON, D. C.
FEB'Y 21.
1888.
ORGANIZED AT PHILADELPHIA-1852.

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1894-95.

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REPORTER ON PROGRESS OF PHARMACY.

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Colorado.	Chas. M. Ford, Denver.
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LIST OF OFFICERS OF THE ASSOCIATION SINCE ITS ORGANIZATION.

(DECEASED IN ITALICS.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Oct. 6, 1852..	Philadelphia, Pa....	*Daniel B. Smith*, Philadelphia.	*George W. Andrews*, Baltimore.	*Samuel M. Colcord*, Boston.	*C. Augustus Smith*, Cincinnati.
Aug. 24, 1853..	Boston, Mass.......	*William A. Brewer*, Boston.	*George D. Coggeshall*, New York.	*Alexander Duval*, Richmond, Va.	Charles B. Guthrie, Memphis, Tenn.
July 25, 1854..	Cincinnati, O.......	*William B. Chapman*, Cincinnati.	Henry T. Cummings, Portland, Me.	*John Meakim*, New York.	*Joseph Laidley*, Richmond, Va.
Sept. 11, 1855..	New York, N. Y....	*John Meakim*, New York.	Charles B. Guthrie, Memphis, Tenn.	*Charles Ellis*, Philadelphia.	*Henry F. Fish*, Waterbury, Conn.
Sept. 9, 1856..	Baltimore, Md......	*George W. Andrews*, Baltimore.	*John L. Kidwell*, Washington, D. C.	Frederick Stearns, Detroit, Mich.	*Henry T. Kiersted*, New York.
Sept. 8, 1857..	Philadelphia, Pa....	*Charles Ellis*, Philadelphia.	*James Cooke*, Fredericksburg, Va.	*Samuel P. Peck*, Bennington, Vt.	A. E. Richards, Plaquemine, La.
Sept. 14, 1858..	Washington, D. C...	*John L. Kidwell*, Georgetown, D. C.	Edward R. Squibb, Brooklyn, N. Y.	*James O'Gallagher*, St. Louis.	Robert Battey, Rome, Ga.
Sept. 13, 1859..	Boston, Mass.......	*Samuel M. Colcord*, Boston.	*William Procter, Jr.*, Philadelphia.	*Joseph Roberts*, Baltimore.	Edwin O. Gale, Chicago.
Sept. 11, 1860..	New York, N. Y....	*Henry T. Kiersted*, New York.	William J. M. Gordon, Cincinnati.	*William S. Thompson*, Baltimore.	*Theodore Metcalf*, Boston.
Aug. 27, 1862..	Philadelphia, Pa....	*William Procter, Jr.*, Philadelphia.	*John Milhau*, New York.	*Eugene L. Massot*, St. Louis.	*J. Faris Moore*, Baltimore.
Sept. 8, 1863..	Baltimore, Md......	*J. Faris Moore*, Baltimore.	*John M. Maisch*, Philadelphia.	Chas. A. Tufts, Dover, N. H.	*George W. Weyman*, Pittsburgh.
Sept. 21, 1864..	Cincinnati, O.......	William J. M Gordon, Cincinnati.	*Richard H. Stabler*, Alexandria, Va.	Enno Sander, St. Louis.	*Thomas Hollis*, Boston.
Sept. 5, 1865..	Boston, Mass.......	*Henry W. Lincoln*, Boston.	*George C. Close*, Brooklyn, N. Y.	*Elijah W. Sackrider*, Cleveland, O.	Charles A. Heinitsh, Lancaster, Pa.

Aug. 22, 1866	Detroit, Mich.	Frederick Stearns, Detroit, Mich.	*Edward Parrish*, Philadelphia.	Ezekiel H. Sargent, Chicago.	*John W. Shedden*, New York.
Sept. 10, 1867	New York	*John Milhau*, New York.	Robert J. Brown, Leavenworth, Kan.	N. Hynson Jennings, Baltimore.	*Daniel Henchman*, Boston.
Sept. 8, 1868	Philadelphia, Pa.	*Edward Parrish*, Philadelphia.	*Ferris Bringhurst*, Wilmington, Del.	*Edward S. Wayne*, Cincinnati.	Albert E. Ebert, Chicago.
Sept. 7, 1869	Chicago, Ill.	Ezekiel H. Sargent, Chicago.	Ferdinand W. Sennewald, St. Louis.	*John H. Pope*, New Orleans.	Joel S. Orne, Cambridgeport, Mass.
Sept. 13, 1870	Baltimore, Md.	*Richard H. Stabler*. Alexandria, Va.	Fleming G. Grieve, Milledgeville, Ga.	James G. Steele, San Francisco.	*Eugene L. Massot*, St. Louis.
Sept. 12, 1871	St. Louis, Mo	Enno Sander, St. Louis.	C. Lewis Diehl, Louisville, Ky.	George F. H. Markoe, Boston.	Matthew F. Ash, Jackson, Miss.
Sept. 3, 1872	Cleveland, O.	Albert E. Ebert, Chicago.	*Samuel S. Garrigues*, East Saginaw, Mich.	Edward P. Nichols, Newark, N. J.	*Henry C. Gaylord*, Cleveland, O.
Sept. 16, 1873	Richmond, Va.	John F. Hancock, Baltimore.	William Saunders, London, Ont.	John T. Buck, Jackson, Miss.	*Paul Balluff*, New York.
Sept. 8, 1874	Louisville, Ky.	C. Lewis Diehl, Louisville, Ky.	*Joseph Roberts*, Baltimore.	William T. Wenzell, San Francisco.	Augustus R. Bayley, Cambridgeport, Mass.
Sept. 7, 1875	Boston, Mass.	George F. H. Markoe, Boston.	Frederick Hoffmann, New York.	T. Roberts Baker, Richmond, Va.	Christian F. G. Meyer, St. Louis.
Sept. 12, 1876	Philadelphia, Pa.	Charles Bullock, Philadelphia.	Samuel A. D. Sheppard, Boston.	*Gustavus J. Luhn*, Charleston, S. C.	*Jacob D. Wells*, Cincinnati.
Sept. 4, 1877	Toronto, Can.	William Saunders, London, Ont.	Ewen McIntyre, New York.	John Ingalls, Macon, Ga.	*Emlen Painter*, San Francisco.
Nov. 26, 1878	Atlanta, Ga.	*Gustavus J. Luhn*, Charleston, S. C.	Frederick T. Whiting, Great Barrington, Mass.	Henry J. Rose, Toronto, Can.	*William H. Crawford*, St. Louis.
Sept. 9, 1879	Indianapolis, Ind.	George W. Sloan, Indianapolis, Ind.	T. Roberts Baker, Richmond, Va.	Joseph L. Lemberger, Lebanon, Pa.	Philip C. Candidus, Mobile, Ala.
Sept. 14, 1880	Saratoga, N. Y.	James T. Shinn, Philadelphia.	George H. Schafer, Fort Madison, Ia.	William S. Thompson, Washington.	William Simpson, Raleigh, N. C.

LIST OF OFFICERS (Continued).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Aug. 23, 1881..	Kansas City, Mo....	*P. Wendover Bedford*, New York.	*Emlen Painter*, San Francisco.	George Leis, Lawrence, Kan.	*John F. Judge*, Cincinnati.
Sept. 12, 1882..	Niagara Falls, N. Y..	Charles A. Heinitsh, Lancaster, Pa.	John Ingalls, Macon, Ga.	Louis Dohme, Baltimore.	*William B. Blanding*, Providence, R. I.
Sept. 11, 1883..	Washington, D. C...	William S. Thompson, Washington, D. C.	Charles Rice, New York.	*Frederick H. Masi*, Norfolk, Va.	Edward W. Runyon, San Francisco.
Aug. 26, 1884..	Milwaukee, Wis	John Ingalls, Macon, Ga.	*John A. Dadd*, Milwaukee, Wis.	Henry Canning, Boston, Mass.	*Charles F. Goodman*, Omaha, Neb.
Sept. 8, 1885..	Pittsburgh, Pa......	*Joseph Roberts*, Baltimore, Md.	Albert H. Hollister, Madison, Wis.	Albert B. Prescott, Ann Arbor, Mich.	Joseph S. Evans, West Chester, Pa.
Sept. 7, 1886..	Providence, R. I....	Chas. A. Tufts, Dover, N. H.	*Henry J. Menninger*, Brooklyn, N. Y.	M. W. Alexander, St. Louis, Mo.	Norman A. Kuhn, Omaha, Neb.
Sept. 5, 1887..	Cincinnati, O.......	John U. Lloyd, Cincinnati, O.	M. W. Alexander, St. Louis, Mo.	A. K. Finlay, New Orleans, La.	Karl Simmon, St. Paul, Minn.
Sept. 3, 1888..	Detroit, Mich	M. W. Alexander, St. Louis, Mo.	Jas. Vernor, Detroit, Mich.	Fred. Wilcox, Waterbury, Conn.	Alvin A. Yeager, Knoxville, Tenn.
June 24, 1889..	San Francisco, Cal..	*Emlen Painter*, New York.	Karl Simmon, St. Paul, Minn.	Wm. M. Searby, San Francisco.	Jos. W. Eckford, Aberdeen, Miss.
Sept. 8, 1890..	Old Pt. Comfort, Va.	A. B. Taylor, Philadelphia.	A. B. Stevens, Ann Arbor, Mich.	Chas. E. Dohme, Baltimore, Md.	Jas. M. Good, St. Louis, Mo.
April 27, 1891..	New Orleans, La....	A. K. Finlay, New Orleans, La.	Geo. J. Seabury, New York, N. Y.	W. H. Torbert, Dubuque, Ia.	L. T. Dunning, Sioux Falls, S. Dak.
July 14, 1892..	Profile House, N. H.	Jos. P. Remington, Philadelphia.	A. P. Preston, Portsmouth, N. H.	Sidney P. Watson, Atlanta, Ga.	Wm. H. Averill, Frankfort, Ky.
Aug. 14, 1893..	Chicago, Ill........	Edgar L. Patch, Boston.	Leo Eliel, South Bend, Ind.	Wiley Rogers, Louisville, Ky.	Chas. Caspari, Jr., Baltimore, Md.
Sept. 3, 1894..	Asheville, N. C.	William Simpson, Raleigh, N. C.	Chas. M. Ford, Denver, Colo.	Jno. N. Hurty, Indianapolis, Ind.	Jos. E. Morrison, Montreal, Can.

TREASURERS.

Alfred B. Taylor, Philadelphia, 1852–54.
Samuel M. Colcord, Boston, 1854–56, and 1857–59.
James S. Aspinwall, New York, 1856–57.
Ashel Boyden, Boston, 1859–60.
Henry Haviland, New York, 1860–63.
J. Brown Baxley, Baltimore, 1863–65.
Charles A. Tufts, Dover, N. H., 1865–86.
Samuel A. D. Sheppard, Boston, 1886–95.

RECORDING SECRETARIES.

George D. Coggeshall, New York, 1852–53.
Edward Parrish, Philadelphia, 1853–54.
Edward S. Wayne, Cincinnati, 1854–55.
William J. M. Gordon, Cincinnati, 1855–59.
Charles Bullock, Philadelphia, 1859–60.
James T. Shinn, Philadelphia, 1860–62.
Peter W. Bedford, New York, 1862–63.
William Evans, Jr., Philadelphia, 1863–64.
Henry N. Rittenhouse, Philadelphia, 1864–65.
H. M. Whelpley, St. Louis, 1893.
Joseph P. Remington, Philadelphia, 1894.

CORRESPONDING SECRETARIES.

William Procter, Jr., 1852–53, and 1854–57.
William B. Chapman, Cincinnati, 1853–54.
Edward Parrish, Philadelphia, 1857–58.
Ambrose Smith, Philadelphia, 1858–59.
William Hegeman, New York, 1859–60.
Peter W. Bedford, New York, 1860–62, and 1863–65.
John M. Maisch, Philadelphia, 1862–63.
Joseph P. Remington, Philadelphia, 1893–94.

PERMANENT SECRETARIES.

John M. Maisch, Philadelphia, 1865–93.
Chas. Caspari, Jr., Baltimore, 1894–.

LOCAL SECRETARIES.

For the meeting held in
1867....*P. Wendover Bedford.*
1868....Alfred B. Taylor.
1869....*Henry W. Fuller.*
1870....*J. Faris Moore.*
1871....*William H. Crawford.*
1872....*Henry C. Gaylord.*
1873....Thomas H. Hazard.
1874....Emil Scheffer.
1875....Samuel A. D. Sheppard.
1876....Adolphus W. Miller.

For the meeting held in
1877....Henry J. Rose.
1878....*Jesse W. Rankin.*
1879....Eli Lilly.
1880....Charles F. Fish.
1881....William T. Ford.
1882....*Hiram E. Griffith.*
1883....Charles Becker.
1884....Henry C. Schranck.
1885....George A. Kelly.
1886....*William B. Blanding.*

For the meeting held in
1887....George W. Voss.
1888....James Vernor.
1889....Edward W. Runyon.
1890....Charles E. Dohme.
1891....A. K. Finlay.
1892....H. M. Whitney.
1893....Henry Biroth.
1894....W. G. Smith.
1895....Edm. L. Scholtz.

REPORTERS ON PROGRESS OF PHARMACY.

C. L. Diehl, Louisville, Ky., 1873–91.
Chas. Rice, New York, N. Y., 1891–92.
Henry Kraemer, New York, N. Y., 1892–95.

AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Appointed by the President in compliance with the following resolutions:

Resolved, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.; such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

Resolved, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the great advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

Resolved, That whilst it is desirable that the authorized agents shall at all times render their accounts as promptly as convenient, it is especially to be desired that they render a complete account to the Treasurer of such moneys as are in their hands on the first day of August and December in each year, in order that the Treasurer may be able to make his yearly accounts as full as possible. (Passed by Council, 1883.)

Alabama,	Chas. A. Mohr,	Mobile.
Arkansas,	John B. Bond, Main and Fifth streets,	Little Rock.
	William L. Dewoody,	Pine Bluff.
California,	William T. Wenzell, 322 Polk street,	San Francisco.
	George B. Flint, 1101 Broadway,	Oakland.
Colorado,	Edmund L. Scholtz, Sixteenth & Stout streets,	Denver.
Dist. of Columbia,	John A. Milburn, 1817 Sixteenth st., N. W.,	Washington.
Connecticut,	John K. Williams, 391 Main street,	Hartford.
	Warren A. Spalding, 19 Church street,	New Haven.
	Luzerne I. Munson, Apothecaries' Hall,	Waterbury.
Delaware,	Linton Smith, Church and Bennett streets,	Wilmington.
Florida,	William Aird, Maggie & E. Brough streets,	Jacksonville.
	Sydney B. Leonardi, Franklin st.,	Tampa.
Georgia,	John P. Turner,	Columbus.
	Robert H. Land, 812 Broad street,	Augusta.
	John Ingalls, Fourth and Poplar streets,	Macon.
Illinois,	David G. Plummer, 6 Main street,	Bradford.
	C. S. N. Hallberg, 358 Dearborn street,	Chicago.
	Charles Zimmerman, 423 S. Adams street,	Peoria.
Indiana,	Henry J. Schlaepfer, Second and Main streets,	Evansville.
	George W. Sloan, 22 W. Washington street,	Indianapolis.
	Jacob Baur, 701 Wabash avenue,	Terre Haute.

Iowa,	John W. Ballard, 106 West Second street,	Davenport.
	Theodore W. Ruete, 568 Main street,	Dubuque.
	George H. Schafer, 713 Front street,	Fort Madison.
	Silas H. Moore, 80 Fourth street,	Sioux City.
Kansas,	George Leis, 747 Massachusetts street,	Lawrence.
	Robert J. Brown, 113 Delaware street,	Leavenworth.
Kentucky,	George A. Zwick, Eleventh st. and Madison ave.,	Covington.
	William H. Averill, 435 Main street,	Frankfort.
	C. Lewis Diehl, Third street and Broadway,	Louisville.
Louisiana,	Alexander K. Finlay, 186 Camp street,	New Orleans.
Maine,	Noah S. Harlow, 4 Smith's Block,	Bangor.
	Henry H. Hay, Free and Middle sts.,	Portland.
Maryland,	D. M. R. Culbreth, Charles and Eager streets,	Baltimore.
	Thomas W. Shryer, 111 Baltimore street,	Cumberland.
Massachusetts,	S. A. D. Sheppard, 1129 Washington street,	Boston.
	Joel S. Orne, 493 Main street,	Cambridgeport.
	B. Frank Stacey, Thompson Square,	Charlestown.
	Frederick T. Whiting, Main street,	Great Barrington.
	Freeman H. Butler, 141 Central street,	Lowell.
	James E. Blake, 64 North Second street,	New Bedford.
	John H. Manning, 51 North street,	Pittsfield.
	Joseph J. Estes, Union and Church streets,	Rockland.
	Thomas B. Nichols, 178 Essex street,	Salem.
	William Bush, 56 Front street,	Worcester.
Michigan,	Ottmar Eberbach, 12 South Main street,	Ann Arbor.
	James Vernor, 235 Woodward avenue,	Detroit.
	Jacob Jesson, Western avenue and Jefferson st.,	Muskegon.
Minnesota,	E. Floyd Allen, 1020 Hennepin avenue,	Minneapolis.
	Karl Simmon, Seventh and Sibley streets,	St. Paul.
Mississippi,	Joseph W. Eckford, Commerce street,	Aberdeen.
	Matthew F. Ash, P. O. Box 129,	Jackson.
Missouri,	William T. Ford, 1305 Cherry street,	Kansas City.
	James M. Good, 2348 Olive street,	St. Louis.
Nevada,	William A. Perkins, 84 South C street,	Virginia City.
New Hampshire,	Francis C. Miville, 1023 Elm street,	Manchester.
	Nelson S. Whitman, 175 Main street,	Nashua.
New Jersey,	Wm. M. Oliver, 132 Broad street,	Elizabeth.
	Hermann Klussmann, Fourth st. & Lafayette ave.,	Hoboken.
	Maxwell Abernethy, 188 Newark avenue,	Jersey City.
	Charles B. Smith, 861 Broad street,	Newark.
	Howard P. Reynolds, Park and North avenues,	Plainfield.
New York,	Charles H. Gaus, 202 Washington avenue,	Albany.
	Charles O. Rano, 1872 Niagara street,	Buffalo.
	William L. Du Bois, 281 Main street,	Catskill.
	John Hepburn, 103 Main street,	Flushing.
	Harvey G. Goodale, P. O. Box 29,	Jamaica.
	James T. King, Main and South streets,	Middletown.
	John McKesson, Jr., 91 Fulton street,	New York.
	G. H. Haass, 105 East Main street,	Rochester.
	John G. Bissell, 45 Dominick street,	Rome.
	Charles F. Fish, 348 Broadway,	Saratoga.
	Charles W. Snow, 214 Warren street,	Syracuse.
	William Blaikie, 202 Genesee street,	Utica.

North Carolina,	William Simpson, 101 Fayetteville street,	Raleigh.
	John H. Hardin, 124 South Front street,	Wilmington.
Ohio,	J. U. Lloyd, Court and Plum streets,	Cincinnati.
	George L. Hechler, 1099 Broadway,	Cleveland.
	Charles Huston, 47 South High street,	Columbus.
	Henry F. Kurfurst, 502 Xenia avenue,	Dayton.
	Thomas J. Casper, 41 East Main street,	Springfield.
	Charles Hohly, 602 S. St. Clair street,	Toledo.
Oregon,	Louis Blumauer, Fourth and Morrison streets,	Portland.
Pennsylvania,	Jacob A. Miller, Second and Chestnut streets,	Harrisburg.
	Charles A. Heinitsh, 16 East King street,	Lancaster.
	Joseph L. Lemberger, 5 North Ninth street,	Lebanon.
	Richard M. Shoemaker, Fourth and Race streets,	Philadelphia.
	George A. Kelly, 101 Wood street,	Pittsburg.
	Philip M. Ziegler, 526 Penn street,	Reading.
	John M. McNeil, Broadway,	Scottdale.
	Edward A. Cornell, Fourth and Pine streets,	Williamsport.
Rhode Island,	Wm. H. Cotton, 226 Thames street,	Newport.
	Wm. K. Reynolds, 354 Friendship street,	Providence.
South Carolina,	Edward S. Burnham, 369 King street,	Charleston.
	Oscar E. Thomas, 164 Main street,	Columbia.
Tennessee,	Jas. S. Robinson, Second and Madison streets,	Memphis.
	C. J. Gooding,	Knoxville.
	John C. Wharton, Vine and Church streets,	Nashville.
Texas,	Thomas W. Powell, 10 Houston street,	Fort Worth.
	Geo. J. F. Schmitt, 507 W. Commerce street,	San Antonio.
Utah,	Frank A. Druehl, Main and 3d South streets,	Salt Lake City.
Vermont,	Geo. A. Crossman, 2 Simonds Block,	Brandon.
Virginia,	Edward C. Jackson, 523 Church street,	Norfolk.
	T. Roberts Baker, 919 East Main street,	Richmond.
Washington,	Henry E. Holmes,	Seattle.
West Virginia,	Edwin L. Boggs, Kanawha Bank Building,	Charleston.
	Edmund Bocking, 1 Odd Fellows' Hall,	Wheeling.
Wisconsin,	Albert H. Hollister, 3 N. Pinckney street,	Madison.
	John R. Drake, 365 East Water street,	Milwaukee.
Prov. Nova Scotia,	William A. Simson,	Halifax.
Prov. Ontario,	John Lowden, 53 Colborne street,	Toronto.
Prov. Quebec,	Henry R. Gray, 122 St. Lawrence Main street,	Montreal.

THE PERMANENT FUNDS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the San Francisco meeting in 1889, the Permanent Secretary was directed to publish annually, in the Proceedings, a brief history of the origin, money value, and use to which each Fund may be applied.

There are three permanent Funds at the present time, all of which are invested in government bonds, in the name of the Treasurer of the American Pharmaceutical Association, and kept in the custody of the Chairman of the Council.

THE LIFE MEMBERSHIP FUND.

The Constitution, as originally adopted in 1852, and up to the year 1856, contained no provision for life membership or for the creation of a permanent fund. In the year named, a revised Constitution was reported by a committee, and, after consideration, adopted (see Proceedings 1856, pp. 12, 14, 27 and 79). Article II., Section 7 (afterwards Section 8), contained the following provision:

"Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect."

Owing to increased expenditures for the publication of the Proceedings, etc., the Association found it necessary in 1867 (Proceedings, p. 75) to increase its revenue, one of the measures being the erasing of Section 8, and the total abandonment of life membership in the future.

In 1870 a revised Constitution was adopted (see Proceedings 1870, pp. 87–96), and is in force at the present time, containing the following:

"Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, *the annual interest of which only shall be used by the Association for its current expenses.*"

Chapter VI., Article 5, of the By-Laws adopted the same year, reads as follows:

"Any member who shall pay to the Treasurer the sum of *seventy-five dollars at a time* shall become a life member, and shall be exempt from all future annual contributions."

In the roll of members for the year 1872 (page 338) the name of the late Charles W. Badger, of Newark, N. J., appears for the first time as a life member, and the only one (until the time of his death in 1877) under this provision, which was subsequently modified (Proceedings 1879, page 799) so as to reduce the sum to be paid into the treasury by those who had been members for from five to twenty years. In the same year the published roll contained the names of two new life members. The article on life membership was further modified in 1888 (Proceedings, page 52) so as to apply also to those who have been members for over twenty years (see Chapter VIII., Article 4 of By-Laws). Under this clause the life membership (new style) of the present roll is thirty-seven, as published in the Proceedings.

The Treasurer's report for 1880 (page 524) states the life membership fund to be $75, for 1881 (p. 513) $613, for 1882 (p. 608) $685, for 1883 (p. 436) $904.38, and for 1884

(p. 524) $944.14. At the Milwaukee meeting, held in the same year, the Association directed (Proceedings, p. 525) that $316, which amount had been in past years donated to the funds of the Association by various members, be withdrawn from the general fund and be added to the Life Membership Fund. At the Providence meeting in 1886 (Proceedings, p. 147), it was recommended by the Finance Committee, and approved by the Council and by the Association, that the sum of $3,000 be transferred from the general fund to the Life Membership Fund. At the Cincinnati meeting in 1887 (Proceedings, p. 471), the Association ordered again a transfer to the same fund of $4,000.

Since 1887 the annual reports of the Chairman of the Council give the number of each bond of the Government securities in which the Life Membership Fund is invested. The report published on page 13 of the present volume shows that on July 1st, 1894, the value of the Life Membership Fund was $10,475.72, of which sum *the annual interest only shall be used by the Association for its current expenses.*

THE EBERT FUND.

At the Richmond meeting in 1873 (Proceedings, p. 58), Mr. Albert E. Ebert presented to the Association the sum of five hundred dollars, to be used in the following manner:

"The money to be properly invested by order of the Executive Committee, and the annual interest derived therefrom to be appropriated *for conferring a suitable prize* for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determined merit, for the preparation of chemical or pharmacal products: the prize to be awarded by a suitable committee within six months after the annual meeting at which the essays are presented for competition; *provided*, that in case no one of the essays offered is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected, and the sum added to that of the Fund."

The offer was accepted by the Association, and by a special vote (*Ibid.*, page 70) the fund was ordered to be called the *Ebert Fund*, and the prize awarded from the proceeds to be known as the *Ebert Prize.*

The Ebert Prize was awarded for the year 1874 to Chas. L. Mitchell; for 1877, to Fred. B. Power; for 1882, to John U. Lloyd; for 1886, to Emlen Painter; for 1887, to Edward Kremers; for 1888, to Jos. F. Geisler; for 1890, to Wm. T. Wenzell; and for 1891, to John U. Lloyd.

The Ebert Fund amounted in 1883 (Proceedings, p. 436) to $683.43. Since 1887 the reports of the Chairman of the Council specify the securities in which this fund is invested. On July 1st, 1894 (Proceedings, p. 13), its reported value was $750.11. The *annual interest must be applied to a prize for an original investigation* meeting the requirements stated above.

THE CENTENNIAL FUND.

After the meeting held in Philadelphia in 1876, the local committees, on settling all accounts for the entertainment of the Association, had an unexpended balance left, which by subsequent collections made in Philadelphia was increased to $525. At the Toronto meeting in 1877 (Proceedings, p. 481), Dr. A. W. Miller, local secretary for 1876, presented this sum in the name of the local committees, to the Association, with this condition, "that a like amount be subscribed by the members within one year," with a view of establishing a fund *to aid in the prosecution of original investigations*, the interest accruing from the investment of the fund to be devoted to the defraying of expenses actually incurred by members in conducting investigations in some branch of science connected with pharmacy. The Association accepted the conditions (*Ibid.*, pp. 526, 528), and adopted the name *Centennial Fund.*

The collection of a like amount by the Association was completed at the Saratoga meeting (Proceedings 1880, p. 553), when $582.81 had thus been received. In the following year a committee of the Centennial Fund was provided for in the By-Laws of the Council, Chapter VII. (Proceedings 1881, pp. 190, 549). Members have not availed themselves of this Fund to the extent contemplated at its foundation; for the amounts paid out have been only $7.50 to Rob. B. Warder for material used for investigations reported in 1885; $96.80 used by the Committee on National Formulary during the years 1886 and 1887 (Proceedings 1889, page 16); and $32 to Edward Kremers for material necessary for the prosecution of scientific research on the menthol group, reported in the Proceedings for 1892, $50 to the same investigator in 1893, and $50 again to the same investigator, as shown in the present volume.

The original sum of $1117.81 ($525+582.81) had increased in 1883 to $1232.76. Since 1887 the securities in which the Fund is invested are specified in the reports of the Chairman of the Council; the reported value was $1397.83 on July 1, 1894 (see Proceedings, p. 13). *The interest accruing from this Fund is to be used for defraying the expenses incurred in conducting original investigations in pharmacy or an allied science.*

THE GENERAL FUND.

In October, 1891 (see Proceedings 1892, page 13), the Council instructed the Treasurer to draw from the cash on deposit a sufficient sum and purchase therewith three bonds, one thousand dollars each, the same to be such bonds as shall be approved by the Finance Committee, said bonds to be registered in the name of the Treasurer of the American Pharmaceutical Association, and placed in the custody of the Chairman of the Council.

The investment was made in bonds of the American Security and Trust Company at Washington, D. C., for the sum of $3021.62 (see Proceedings 1892, pages 27 and 28).

PRIZES.

The following resolutions were adopted August 15, 1893 (see page 56, Proc. 1893):

Resolved, That if worthy papers be presented, the Association award annually three prizes for the three most valuable papers, aggregating the sum of $150.00, and apportioned as follows: $75.00 for the first, $50.00 for the second, and $25.00 for the third prize.

Resolved, That a Committee of three be annually appointed by the President of the Association, their duty to be, first, to decide if one or more of the papers presented are worthy of a prize, and second, to decide upon the relative merits of such papers as are deemed worthy.

Resolved, That nothing in these resolutions shall be so construed at any time as to prevent the writer of the Ebert Prize paper from also receiving one of the Association Prizes for said paper.

For names of members of this committee see page iv.

The old resolution on Prizes which the above replaces will be found on page 506 of the Proceedings for 1887.

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PREFATORY NOTICE.

At the forty-second annual meeting of the Association at Asheville, N. C., the Council determined that the distribution of the printed Minutes, together with the papers read at the meeting, in advance of the bound volume of the Proceedings, which plan had been in operation since 1891, should be discontinued. This action of Council was approved by the Association at large at its final General Session on September 8, 1894.

On account of the large number of papers presented to the Sections on Scientific Papers and on Pharmaceutical Education and Legislation at the Asheville meeting, as also of the unexpected increase in the length of the Report on the Progress of Pharmacy, the issue of this volume has been unavoidably delayed nearly six weeks.

With the object of securing for the Proceedings as wide a distribution as possible, the Committee on Publication offer the different issues at the following reduced rates:

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1868	16	13 25	7 95	1881	29	44 75	22 38	1894	42	106 25	42 50
1869	17	14 75	8 85	1882	30	47 75	23 50				

Orders for Proceedings should be sent to the Permanent Secretary, 109 Aisquith street, Baltimore, Md.

The gold badge of the Association may be procured from the Permanent Secretary on receipt of $2.

Blank forms of applications and recommendations for membership may be obtained from the Permanent Secretary or from the Committee on Membership; when properly filled up they should be sent to the Secretary of the Committee on Membership, Geo. W. Kennedy, Pottsville, Pa., at least one week before the meeting; if sent later, they should be addressed to him in the care of the Local Secretary, Edmund L. Scholtz, Denver, Colo.

The forty-third annual meeting of the Association will convene in Denver, Colorado, on the second Wednesday (14th day) of August, 1895, at 3 o'clock p. m.

MINUTES

OF THE

FORTY-SECOND ANNUAL MEETING.

THE American Pharmaceutical Association met at its forty-second annual meeting in the concert and ball-room of the Battery Park Hotel at Asheville, N. C., on Monday, September 3d, 1894, at 3 : 45 p. m. After calling the meeting to order, President Patch, of Boston, introduced the Hon. T. W. Patton, Mayor of Asheville, who delivered the following address of welcome :

Ladies and Gentlemen, Mr. President : Will you permit me to congratulate you, Sir, upon being the presiding officer of such an Association, and especially upon the discipline it displays in obedience to your commands and suggestions. It was proposed, ladies and gentlemen, that you should move forward a few moments ago, and I saw how readily the request was complied with; you have almost occupied the platform, and so far as the history of Asheville is concerned, it would be much more appropriately filled than it is now.

Mr. President and ladies and gentlemen of the American Pharmaceutical Association, I hope you will not measure the welcome which we North Carolinians extend to you today by the halting address of myself. I assure you, gentlemen, it is a great honor to our State—our great State—and I will endeavor to prove to you that it is a great honor to this great State of North Carolina to have so many intelligent representatives of one of the most valuable lines of business within our nation coming to pay us a visit. I thank you, gentlemen, with all my heart for having done so. I think it is appropriate that yon should have chosen North Carolina as the place of this meeting. In many States of this Union you would have found much more of its wealth, much more of the attractions which wealth always brings with it, many of the charms which we cannot present to you here. Of that I am fully aware. We are proud of America, none more so than I am, and you, sir, having traveled from Boston to New Orleans, from Maine to Chicago, and I hope before long much further west, my experience through America is that I am proud of being an American (applause). Time and again, you gentlemen whom I have the pleasure of meeting from Boston, I thank you exceedingly for being here, and giving me the opportunity to show my appreciation of the great kindness which I from time to time have received in your great and glorious city, undoubtedly the Hub of America (applause). But, gentlemen, while I am free to confess that in many States of this Union you would have found more wealth, and a greater number of attractions that wealth would bring, I think I can show you in North Carolina charms which you could not see elsewhere. Professional brethren from other States among us will see samples of its products and medicinal herbs, and I think I can safely state that our State produces more medicinal herbs than any other. This I will leave to my friends of the North Carolina Pharmaceutical Association to show you to be a fact. I know it to be a fact, and they will show it to you.

I heard this Association spoken of as an association of teachers and poisoners, I believe it is a slander. I do not believe anything of the kind, but if it is true, you have come to the wrong place, for you will find nothing in North Carolina but what will give health, happiness and prosperity (applause). Gentlemen, I am sure one characteristic of our State all of us here are proud to be able to exemplify to you at this time, and that is the characteristic sustained from time immemorial of hospitality. We welcome you, ladies and gentlemen, to our circle, to our town, to our State, to our mountains, to our seaboard, to the interior of our country: wherever you may go, you will find hospitable hearts, warm hand-shaking, and honorable men and women, always ready to receive you, and in proof that I propose as Mayor of Asheville. I am proud to say that I know that the citizens of this town and many citizens of North Carolina will set forth all these facts to you during the coming week (applause).

Gentlemen, we have a programme provided for this week which I trust will be full of pleasure. We regret that some of our appliances are not as great as we would like to have them, the number of our guests exceeding our ability to take you to drive all at once, for instance—so on Tuesday and Wednesday, you will find we will have to divide you, some to go on Tuesday, others on succeeding days. I know you will co-operate with us in all these affairs, and I am very sure, for this is a drive to be taken to the magnificent estate of George W. Vanderbilt, among other estates you will see, and your committee has done well in providing such an entertainment for you, and yours. I thank you extremely for coming, ladies and gentlemen, to visit our town at this time. I think I heard a description of a Frenchman, and Englishman and an American, which is illustrative. A man said at a foreign hotel, he could always tell what nation his fellow guests hailed from: if a Frenchman, he was all politeness and courtesy, with his wife upon his arm all attention to her all the evening; if an Englishman came, a big burly man walked along in front, and a timid little lady streaming along some short distance behind; when the American came in it was with a big, strong handsome lady of course always in front, and a timid, poor-looking little man like myself behind. (Applause and laughter.) Ladies, I believe that is slander upon our countrymen and upon you. However you come, no matter in what position in regard to the gentlemen, before, behind or with them, French, American or Englishmen, I am heartily glad to see you. (Applause).

By invitation of the chair, Mr. Eliel replied in behalf of the Association in fitting words, thus:

Mr. Mayor and Gentlemen: On behalf of the American Pharmaceutical Association we tender you our kindest thanks for your warm words and kind words of welcome which you have given to us here, and we shall try to the best of our ability to deserve it.

The American Pharmaceutical Association, sir, is national in its ideas. It knows neither North or South, East or West. Sir, we meet in all parts of this great American Continent, and we have no ideas of nationality, and if in selecting this spot we did so, it was to gather information to a certain extent regarding the different sections of this great country, so we are here for that purpose, as well as to enjoy the beauties of Asheville and its surrounding mountains, and one of the things we have been taught since we are here is, that while up in the north we call this North Carolina, we here heard you call it North Caroleena, I presume you know how to pronounce the name of your own State. Now we have learned something this morning. And I again thank you, but I trust that when the President again desires to call upon any one to speak, he will call upon somebody to respond other than myself, as I am not very apt, or very ready at replies on so short a notice (applause).

President Patch then called Vice-President Eliel to the chair and delivered his annual address, which was listened to with much interest. President Patch spoke as follows:

Fellow Members of the American Pharmaceutical Association:—In reviewing the addresses of several past presidents, I find it is customary to devote some time to the commendation of the place of meeting, the Local Secretary and the Committee of Entertainment.

Permit me to depart from this custom, and to merely remark that the beautiful panorama spread before us on every hand bears eloquent testimony to the goodness of God and the wisdom of your choice in selecting Asheville as a place of meeting; and allow me to suggest that a total absence of criticisms and a determined effort on the part of every one present to show appreciation of the labor bestowed to make our stay agreeable and profitable will be more appreciated by your local Secretary and associates, than any words of mine.

It is also customary to ask for the shortcomings of your presiding officer the forbearance and indulgence of the Association. This I will not do. Find all the fault you wish with my incapacity and my failure to meet your expectations, but bear in mind that in so doing you are criticising your own lack of good judgment in selection, and learn to do more wisely in the future.

I lay no claim to ability as an orator, writer or parliamentarian, but will do the best I can to discharge the duties of the office I find myself in. thanking you for the generous estimate that permitted you to place me here, and expressing my appreciation to all members who have so willingly extended their help to make the year a successful one.

Very soon after my election I was called upon to appoint a temporary successor to our late lamented Permanent Secretary, Prof. Maisch, who departed this life September 10, 1893. Holding the position for years without a rival, and securing to our Association the honor and prestige of his useful and successful career, his loss seemed irreparable.

I was informed by several that it was my official duty to at once appoint a successor, but the step seemed too important a one to take without counsel and advice. Hence I brought the matter to the attentton of the Council. Sentiment seemed to be about evenly divided between Prof. Whelpley, Prof. Caspari, and Prof. Remington, and several ballots were necessary to secure a choice.

Prof. Remington was selected, and consenting to serve, has given to the office the care and attention it merits, and we believe the Association has no reason to discredit the appointment.

Very late in the season Mr. Main resigned as chairman of the Transportation Committee. As the committee was appointed by the Council, it seemed fitting that the resignation should be acted upon by that body, and I referred the matter to the Secretary, Mr. Kennedy. He considered it incumbent upon me to act without consulting the Council, and the time being at hand requiring the action of the Committee, and the circular of the Local Secretary being held for the announcement of the Committee on Transportation, at the suggestion of the retiring chairman, I appointed Mr. Caswell A. Mayo, of New York, to succeed him.

In accordance with a vote passed at the Chicago meeting, instructing the President to appoint a special Membership Committee, to consist of one member from each State and Territory, and one each from the District of Columbia, and the provinces of Nova Scotia, Ontario and Quebec, correspondence was at once opened with representative members in each of the sections referred to, and after the delay incident to securing acceptance, appointing substitutes, etc., we were able to announce the Committee as complete, excepting representatives from the sections of North Dakota and South Carolina.

Failing to secure acceptance of the appointments for these districts after much effort, it was thought best to report the Committee as constituted, that the work of organizing and canvassing might be prosecuted without further hindrance.

The names of the Special Membership Committee and an account of their work will appear in the report of the Chairman of the Membership Committee of the Council, Prof. Chas. Caspari, Jr.

Enough for me to say that applications have been received from more than 150 druggists scattered over the entire United States and Canada, thus widely extending the usefulness of our Association.

It is considered to be the duty of the President to present with his annual Report a resume of matters of practical import that have transpired during the interval between the meetings, and to offer such suggestions for the furtherance of the usefulness of this Association as may occur to him.

An attempt to name the new antis, the anes, and the ines that have sprung Minerva-like from the synthetical laboratory or from the office of the clever manipulator each twenty-four hours since our last meeting seems out of place, in view of the enterprise of our trade journals, and the careful sifting to be given them by our Reporter on the Progress of Pharmacy.

The exhaustive and able review of the last edition of the United States Pharmacopœia presented at our last meeting by my predecessor leaves little to be said in that direction.

The book has been open to criticism for a year and it would be strange, indeed, if some defects and faults could not be found, but I believe every unprejudiced mind must see in it a work of rare excellence, as practical in character as could be expected, and far enough in advance of the general pharmacist to prove an educator of the highest value.

Should any pharmacist or assistant undertake the systematic comparison of his products with the detailed description furnished him he would soon of necessity acquire a fund of information concerning pharmacy, chemistry and botany, that would largely increase his appreciation of the book, his own self-respect, and his value to the community at large.

Our last volume of Proceedings, in the character of original papers presented, the Report on the Progress of Pharmacy, including the abstract of the scientific papers presented to the various State Associations, the alphabetical list of new remedies, the index to papers and publications of interest appearing at home and abroad, equals its predecessors, is worthy the highest position as a valuable work of reference, and should be at the disposal of every progressive pharmacist in our country.

The present volume possesses unusual interest. Its story of the life and achievements of our late honored permanent Secretary, Prof. Maisch, illustrating the possibilities of American Pharmacy and the attainments to be reached by one who persistently, with singleness of purpose pursues a high ideal, should be an inspiration to many young men at the threshold of their careers.

In addition, the Proceedings of 1893 bear witness to the presence among us at our last meeting of distinguished pharmacists from abroad, and in the addresses and discussions of Messrs. Carteighe, Martindale, and others, we find much that is helpful and interesting.

Every honest seeker after improvement has courage to occasionally pray with Burns,

"O wad some power the giftie gie us
To see ourselves as others see us,"

and in the pleasant criticisms of our method of conducting business and of the wide latitude we allow to irrelevant debate which some of us heard at Chicago, this prayer was partially answered, while in the report of Mr. N. H. Martin to the Pharmaceutical Society of Great Britain, we are permitted to see a profile of American Pharmacy cut with all the precision of the scissors artist who "does one in black while he waits."

Such efforts may be measured by the size of the cardboard, and not considered true to nature by the subject; nevertheless there are dim points of resemblance that permit recognition by impartial and observing friends.

Some of the peculiarities or defects might be largely modified by a full-face view, but the most patriotic would be remiss if they professed satisfaction with the best portrait a camera could produce.

We are quite aware that there is unlimited field for improvement in pharmacy here as in Great Britain, and are not surprised that our defects should be manifest to an interested and critical observer from abroad. Nevertheless it affords any of us who have an active interest in pharmaceutical education the deepest satisfaction to observe the great improvement in the quantity and quality of education offered to the American pharmacist, and to predict that our vantage ground is so well fortified and maintained that future progress must be more rapid.

In my own experience, entering pharmacy as a stepping-stone to the study of medicine and matriculating at a College of Pharmacy, I was much disappointed at the superficial character of the instruction, materia medica, botany and theoretical chemistry and pharmacy each year being a practical repetition of the previous course, while no opportunity was given for a moiety of laboratory experience.

But our friend, Mr. Martin, is sadly mistaken when he assumes that this is the state of affairs to-day. Of the thirty-six pharmacy schools, only one is in this condition.

In the brief time since my graduation, the particular college referred to has come to be the possessor of a building and laboratories valued at over one hundred thousand dollars; its facilities for practical instruction are very extensive and elaborate; its course carefully graded, and its instruction largely consists of laboratory work. It more than fulfills the ideal of the most hopeful dreamer of twenty years ago, although he may to-day be as unsatisfied as he was then, the possibilities of the future being so much greater.

And what is true of this institution is true of many of the schools of pharmacy of our country. Boston, New York, Philadelphia, Baltimore, Chicago, Buffalo, St. Louis, Toronto, and many other American cities, have erected costly buildings and equipped departments for practical work in manufacturing and dispensing pharmacy, general chemistry, analytical chemistry and microsopy that a few years since would have been deemed impossibilities.

In this brief time the facilities for pharmaceutical instruction must have appreciated from a few hundreds of thousands to two millions or more in value.

When we consider that the last fourteen years have witnessed the establishment of twenty-three pharmaceutical journals, the enactment of thirty-seven of our forty-six pharmacy laws, and the inauguration of instruction in pharmacy in more than twenty-five of our universities and independent schools of pharmacy, we should be unwise to expect the solidity and adjustment of an old and conservative community, although we believe a little more accurate knowledge would have convinced our friendly critic that we have more than one refreshing oasis in our sea of "educational chaos."

But no man, no community, no nation, can live long on past achievements or develop by idle dreaming. The cost of having done well is a necessity for doing much better.

And as the mightiest construction is only as strong as its weakest points, these must be sought for and assiduously built against before enlarging the area or embellishing the superstructure.

Advance on all lines of education has been extensive. Medical colleges have adopted graded courses, extended the term from two to three or more years, broadened and deepened the lines of instruction, and hedged about admission with entrance examinations that would exclude fifty per cent. of the students of twenty years ago.

Compare some of our medical schools, with forty to fifty professors and instructors, and a four years' graded course of seven months each, with those of forty or fifty years ago, when seven professors gave the same instructions each successive term of twenty weeks only, and attendance upon two such courses was all required.

Yet no one assumes that the medical training is ideally perfect and incapable of extensive improvement.

Judging from our foreign exchanges, there are plague-spots to be cut from the pharmaceutical body abroad, but that does not concern us; our attention should be given to search for the philosopher's stone, to turn our dross and base metal to gold.

That there is much needing transmutation is apparent to the most careless reader of the medical and pharmaceutical journals.

Medical men are found declaiming against prescribing pharmacists and mere sellers of nostrums, and are advocating in public the desirability of dispensing their own remedies on the ground of self-defence, against the popularity of homeopathy that saves the patient a medicine bill, against the unwarranted repetition of the prescription or the transfer to another, and against the scrutiny of their treatment by the examination of their prescriptions, or that they may retain the profit which they now divide with the pharmacist.

Conjointly with this you may observe other earnest, progressive physicians, who have no time to devote to the consideration of such selfish trifles, but are wholly occupied with the important duties of their noble profession and considering the broad questions of national supervision of the public health, the improvement of the sanitary conditions of our cities and towns, and the establishment of such regulations for isolation and inspection as shall prevent all epidemics and largely do away with the need of medication.

In our own ranks, hours of talk and reams of paper have been given to airing the grievances of dispensing by physicians, the encroachment of large manufacturing houses, the rivalry of department stores and the grocer pharmacist, the annoyance of the bar sailing under a drug license, and retailing by wholesalers.

Yet some are still found who accept the situation as an inevitable product of our social condition, and pursue their onward course, perfecting processes, enlarging their fund of knowledge, and striving after a faithful performance of the duties of their calling.

They recognize that in place of half a score of manufacturing pharmacists and chemists, and a few hundred manufacturers of nostrums, we now have nearly six thousand of the two combined; that the number of stores has constantly increased until we now have one to every eighteen hundred and sixty of the population in the entire country, and one to eight hundred and fifty in some of our older sections.

Place this against one to twenty-eight hundred in Italy, one to fifty-three hundred in France, one to fifty-five hundred in Switzerland, and one to ten thousand three hundred in Germany, and we see the necessity for the struggle for maintenance and the cause of the artificial cultivation of the medicine craze, encouraging the consumption of drugs and remedies that oftener outrage than assist nature.

There is no doubt that one-third the number of drug stores and one-sixth the number of physicians would be a greater benefit to the public health than the number we have, could we wisely differentiate, particularly when we bear in mind the fact that in spite of the marvelous advance in surgery, medication is still a process of uncertain experimentation; but socialism has not yet issued its dictum in these matters, and, crowded out of mechanical pursuits by the sacrifice of personal independence and the prohibition of personal excellence which labor organizations enforce, young men of any individuality will continue to enter professional, semi-professional and mercantile life.

We must then be willing to divide and accept the conclusion that a modest compensation is all we may look for.

As President of this body, associated with Dr. Chas. Rice and Prof. A. B. Prescott, I was called upon to judge the papers in the Merck contest.

The competition was restricted to "proprietors or clerks actively engaged in pharmacy as a commercial business, and excluding teachers, instructors and students as such."

It may not be wise to generalize and conclude that the product is truly representative of American Pharmacy, for we know some of the best trained and successful men cannot be prevailed upon to give the benefit of their observation and training to their fellows, either through the medium of this Association or that of their local organization.

Yet it may be proper to present the facts as they appear.

First, observe that although the offer was a munificent one, only one hundred and thirty of the nearly one hundred thousand associated with pharmacy found in it an inspiration to compete.

Several of the papers presented fell outside the plan of competition, but one hundred and thirteen were carefully considered. Most of you are familiar with the topics presented. Five permitted valuable original work.

Query 2. Articles to be prepared to advantage by the druggist.

Query 3. Our native medical plants.

Query 5. Adulterations and sophistication.

Query 9. Prescription difficulties and how to solve them.

Query 15. Iron.

The four papers presented in answer to Query 2, principally suggest non-secret or proprietaries.

The two in reply to Query 4 showed manifest study and personal effort.

In reply to Query 5 we are told that powdered drugs are largely mixed with bran, flour, and corn meal; that manufacturers furnish fluid extracts much deficient in drug power and wanting in alcoholic strength, and from these the pharmacist makes tinctures, syrups and infusions that are of little value.

We are told that many give preference to fluid extracts so reduced in strength that they will not precipitate.

It is pointed out that many chemicals are deficient in quality, and we should use those of the promoters of the competition if we would always be sure of having them "O. K.," but the ground upon which these conclusions are based, the method by which they are determined, and improved processes by which impurities may be avoided, are not presented.

Query 9, which is presumed to touch every retail pharmacist in a most vital point, is neglected by all but one respondent. Fortunately this paper showed observation and care, was adjudged worthy of a prize, and will be published.

It occurred to me that this Association might publish "An Observation Sheet." This should be arranged so that any difficulty in practice, or any peculiarity in experience, could be at once made note of and a copy of the completed sheet forwarded to the Chairman of the Scientific Section for comment and presentation at our next meeting. If our members would show interest in this direction, a large store of valuable suggestions as to incompatibilities, improved formulas, improvements in menstrua, refinement of tests, correction in description, etc., might be secured.

These observation sheets might be mailed with the Minutes of the meeting to each member, with a request to use them.

We might say that a rough classification of the Merck papers would give:

Papers requiring original observation and personal work	8 per cent.
Papers involving commercial aspect only	10 per cent.
Papers relating to educational, ethical, remunerative and general business aspect	82 per cent.

The difficulties barring the way to success may be summarized as "Too many stores;" "Lack of sense of accountability;" "Too great a variety of stock and impossibility to become familiar with it;" "The smallness of the trade narrowing the mind;" "Long hours and mass of detail generate apathy and lack of attention in all but strong-willed or persistent minds;" "Too close competition and too great expense in conducting business;" "Physicians dispensing;" "Cost of maintaining favor with the physician;" "Too little preliminary education to meet the requirements of the present day;" "Insufficient remuneration for demands that must be met;" "Too little attention to the commercial side of business;" "A general lack of business methods;" "Too much theoretical training unfitting for commercial acumen or business push."

Some of the remedies recommended are: "A national pharmacy law involving a national commission which shall arrange for a uniform practical examination in all the States and Territories;" "Combinations that shall regain and maintain control of the distribution and the adjustment of prices of proprietary and kindred goods;" "The manufacture and pushing of non-secrets to replace every advertised nostrum of note;" "Greater care in selecting apprentices;" "Increased compensation to encourage better trained young men to enter pharmacy;" "A training that will enable the pharmacist to do the testing of milk, of water, of wall paper, of urine, etc., and displace the analytical chemist."

The ideal concerning education differs greatly. It ranges from the sentiment that "experience in an ordinary store is the one essential, with possibly the addition of the little surface polish a College of Pharmacy can give" to the demand that the "apprentice must be a high school graduate, and pass examination in the rudiments of History, Natural History, Philosophy, Geology, Algebra, Geometry, Chemistry, Anatomy, Latin and German before entering a store or attending a college."

A necessary drug course is variously considered to include "teaching in theoretical pharmacy, botany and chemistry, and a thorough training in practical botany, pharmacy, chemistry and microscopy, with a good knowledge of hygiene, anatomy and physiology, and a proficient training in the analysis of drugs, food, water and urine, and in the detection of poisons."

By some the college is deemed to possess the one advantage of fitting the young man to "pass the State Board examination without undergoing the drudgery of the store." Others conclude that "colleges have raised the standard of attainments of clerks so high that they demand and secure much higher compensation than formerly, and so deplete the proprietors' profits that the clerk is often better off financially than his employer.

The testimony of the great majority is that "pharmacy as an investment has long since passed its prime, holds its present votaries only by compulsion, and warns off all newcomers." Three only think their calling is all it should be, the grandest calling one can engage in, demanding the highest grade of character, furnishing unlimited opportunity for the acquisition of knowledge, the enrichment and expansion of the mind, and supplying all the recompense, mental, moral and financial, one has a just right to expect!

One of these cheerful optimistic brothers reminds us,

"'Tis hard work, but grit makes the man,
The lack of it the chump,
To be successful boys,
Hang on and hump."

Thinking it might be of some interest and give something to think about, I requested the successful contestants to state briefly whether they were members of the American Pharmaceutical Association, of a State Association, or any local Association, if graduates in pharmacy, and if they enjoyed the advantage of any special training.

Eight of the nine successful proprietors replied as follows: Two are members of the American Pharmaceutical Association, three will join this year, three are not. Four are members of their State Association, and four are not. Three are members of local Associations, five are not. Three are graduates of American Colleges of Pharmacy, two had pharmacy training at Göttingen, Germany, one is a doctor of medicine, one is a graduate in analytical chemistry, and one has had home training and taken the Institute of Pharmacy reading course.

Eleven of the fourteen clerks replied as follows: One hopes to join this Association at this meeting, ten no. Three are members of State Associations, eight are not. One a member of a local organization, ten are not. Seven are graduates of American Colleges of Pharmacy, two are about to graduate, one is a graduate of a classical college, one is engaged in a manufacturing laboratory.

I see you are already wearied, but consider, my friends, that to-day I have my innings for the first, last and only time, by your grace, and bear with me while I offer three suggestions in addition to that relating to the Observation Sheet, a rough draft of which I submit herewith.

First, I recommend that the matter of the establishment of a National Pharmacy Commission and the enactment of a National Pharmacy law, securing as far as practical, uniform methods of registration by practical examination, be referred to the Section on Education and Legislation, with a request that a biil be drafted and presented to the Association for discussion, amendment and subsequent advocacy. It will be some time before this can be secured, but a beginning can be made at once.

Second, I recommend that the Section on Education and Legislation, and on Scientific Papers, present to the Association an outline of a course of instruction in Pharmacy, such as in their estimation it would be desirable for teaching colleges to couform to as far as practicable. We admit that we cannot secure uniformity in instruction, but we can present an ideal good for five to ten years, that may exert some influence upon the standard of education in Pharmacy, although we do not assume to dictate to any school how it shall do its work.

Third, two years ago we met very near heaven, among the White Mountains of our beloved New England. On that point of lofty vantage Dr. Hoffman presented to this Association his conception of the duty of our colleges to husband the resources frittered away in prizes and establish an endowment fund for the higher education of promising graduates, that we might secure in the not far distant future a corps of teachers of pharmacy far in advance of those of to-day.

Here at Asheville we are said to be still nearer heaven than two years ago, if that is possible, and I desire to embrace the opportunity to present for your consideration a project which may possibly seem cloud-like and visionary, yet which might readily be executed, be eminently practical, and extend the usefulness of this Association in advancing the interest and honor of pharmacy.

I recommend the establishment of an American Pharmaceutical Association Scholarship Fund of fifteen hundred dollars annually, for the purpose of securing to suitable candidates the advantages of higher education in pharmacy.

The sum to be raised by voluntary subscription or by appropriations from our treasury of one-half the sum and the solicitation of the balance from the various State Associations.

THE CANDIDATE.

1st. He must be an honor graduate from an American college of pharmacy.

2nd. He must pass a good physical examination.

3rd. He must be free from the impairment caused by the indulgence in the use of tobacco, alcoholic beverages or any other vice that hinders the highest possible physical development and the severest training of the body and mind.

4th. He shall present to the examining board an original paper involving the results of personal observation or experience in some department of investigation of value to pharmacy. This paper shall be published in the Proceedings if considered worthy.

5th. He shall pass a satisfactory examination in Mathematics, Geography, American History, Botany, Theoretical Pharmacy, Chemistry and Latin of Pharmacy and Medicine. (Robinson's Grammar.)

HOW SELECTED.

This Association and each State Association may recommend two candidates for examination, the examination to be held at any annual meeting decided upon.

EXAMINING BOARD.

This shall consist of the officers of the Association and the members of the Committee on Scientific Papers with the Committee on Education and Legislation.

CHARACTER OR TRAINING.

The successful candidate shall be sent to some desirable Continental School or University where he may secure, during three years, the highest training in synthetic chemistry, plant analysis and manufacturing pharmaceutical processes. He shall submit to this Association an annual report embracing a resume of the year's instruction and the methods of instruction employed, and at intervals during the three years' course shall present an outline of methods employed and facilities enjoyed in teaching pharmacy in some prominent school, first in the German Empire, second in France, third in Great Britain.

He shall also submit annually a resume of all original work personally perfomed during the year, in suitable form for publication.

Any failure to meet the responsibilities of the scholarship may be cause for his recall and substitution by another candidate.

On his return to the United States he shall give at least two years to instruction in some College of Pharmacy (if such position offers, as it undoubtedly will) and present each year for two years an original paper for publication in the Proceedings.

I have trespassed severely upon your patience and I can only incidentally refer to the new edition of Remington's Pharmacy, the United States and National Dispensatories. "A Study in Pharmacy" coming from the pen of Prof. Lloyd, the promised new work on Pharmacy by Prof. Caspari, and that of Prof. Coblentz, to the practical interest displayed at the meeting of the International Pharmaceutical Congress, held last year at Chicago, (the first meeting on American soil), and to many things yet undeveloped that are taking shape at the hands and in the minds of American pharmacists, to prove that the genius of American Pharmacy is not idle, she is not wasting golden opportunities and being left behind in the race, she is not an outrider or an indifferent passenger, but she drives the chariot of progress, and like Jehu of old, rides furiously. She is fully aware that

> "A three-fold measure dwells in space,
> Restless length, with flying race,
> Stretching forward, never endeth,
> Ever groundless, depth descendeth.
> Types in these thou dost possess,
> Restless, onward thou must press
> Never halt nor langour know,
> To the perfect wouldst thou go.
>
> "Let thy reach with breadth extend,
> Till the world it comprehend,
> Dive into the depths to see,
> Germ and root of all that be,
> 'Tis the progress gains the goal,
> Ever widens more its bounds:
> In the full the clear is found,
> And the truth dwells underground."
>
> *Schiller.*

Upon motion the President's address was referred to a committee of three, consisting of Thos. F. Main, of N. Y., William Simpson, of N. C., and L. E. Sayre, of Kans., to report, at a future session, upon the suggestions contained therein.

President Patch having resumed the chair, Mr. Kennedy, Secretary of the Council, reported the names of 96 persons proposed for membership, which had been approved by Council, and stated that under the rule (Art. II., Chapter VIII., of the By-Laws) the list of names would be posted conspicuously in the hall for the members to examine; objections, if any, to be made to Council at an early hour.

The Minutes of the Council since the last meeting were then read by the Secretary, Mr. Kennedy. As the Minutes contained a number of important motions concerning the work of the Association, the President called attention to the fact that a vote of approval carried with it the adoption of all the propositions under consideration. The Minutes give the following information:

Business reported by the Secretary as having been disposed of by correspondence.

POTTSVILLE, PA., *September* 18, 1893.

Dear Sir: It is moved by E. L. Patch, and seconded by S. A. D. Sheppard, that the following be adopted:

WHEREAS, In the providence of God the American Pharmaceutical Association has met with an irreparable loss in the death of its honored Permanent Secretary, Prof. John M. Maisch, of Philadelphia, who has served the Association in that office for 28 years, the only Permanent Secretary the Association has had since the creation of the office; and

Whereas, In the loss of Prof. Maisch, the pharmaceutical profession throughout the civilized world has lost one of its most valued and brilliant members; therefore the Council, acting for the Association, would place on record the following series of resolutions:

Resolved, That we express our deep sense of obligation for the untiring efforts of Prof. Maisch to care for and advance the interests of the Association.

Resolved, That in the death of Prof. Maisch the Association has met with a great misfortune, higher pharmacy has been deprived of one of its ablest exponents, and the individual members of the Association have met with a deep affliction.

Resolved, That we extend our deepest sympathy to his suffering family in this hour of bitter grief.

Resolved, That the Secretary of the Council be and hereby is instructed to have a copy of these resolutions, bearing the name of each member of the Council, properly engrossed upon parchment and presented to the family of the deceased.

Please send your vote to the undersigned at once.

Yours respectfully, GEO. W. KENNEDY,
Secretary of Council.

Carried unanimously.

POTTSVILLE, PA., *January* 23, 1894.

Dear Sir: It is moved by Jos. P. Remington, and seconded by S. A. D. Sheppard, that Prof. Maisch's picture, with an extended obituary notice, be put in the 1893 volume of the Proceedings of the American Pharmaceutical Association.

Please send your vote to the undersigned at once.

Yours, &c., GEO. W. KENNEDY.

Carried unanimously.

POTTSVILLE, PA., *January* 26, 1894.

Dear Sir: The undersigned hereby moves that the sum of two hundred (200) dollars, or as much thereof as may be necessary, be appropriated out of the treasury of the

American Pharmaceutical Association for the use of the Committee on Membership, said funds to be used in defraying the expenses of the stationery, printing and postage connected with the issue of 10,000 circulars and application blanks to the special Auxiliary Committee on Membership appointed by the President in conformity with the resolution adopted at Chicago. CHAS. CASPARI, JR.

Seconded by J. P. Remington.

Send your vote to the undersigned.

GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Alpers, Caspari, Conrath, Diehl, Dohme, Eliel, Fennel, Good, Kraemer, Patch, Ramsperger, Remington, Rogers, Sheppard, Smith, Whitney—16.

Not Voting—Ford—1.

POTTSVILLE, PA., *March* 17, 1894.

Dear Sir: It is moved by Chas. E. Dohme, and seconded by E. L. Patch, that the Council appropriate the sum of money necessary to pay the estate of the late John M. Maisch that part of the salary of Permanent Secretary of the American Pharmaceutical Association due for his services from date of his re-election, August 15, 1893, to the day of appointment of his successor, viz., October 7, 1893.

Also that our present Permanent Secretary, Prof. Jos. P. Remington, be paid his pro rata share of the salary of Permanent Secretary from the day of his appointment, October 7, 1893, to the end of his year of service, viz., the annual meeting in September, 1894, the payment to be made in the usual manner, viz., one portion in March, and the balance after the annual meeting.

Please send your vote to the undersigned.

Yours, &c., GEO. W. KENNEDY, *Secretary of Council.*

Carried unanimously.

POTTSVILLE, *May* 10, 1894.

Dear Sir: It is moved by S. A. D. Sheppard and seconded by Chas. T. P. Fennel, that Prof. H. M. Whelpley be requested to have made fifty gold bars to be attached to the gold badge of the Association, and on said bars shall be "Asheville, 1894," to be ready for sale at the next meeting of the Association, at Asheville, North Carolina.

Please send your vote to the undersigned.

Yours, &c., GEO. W. KENNEDY,
Secretary of Council.

Yeas—Caspari, Diehl, Dohme, Eliel, Fennel, Ford, Good, Kraemer, Patch, Ramsperger, Remington, Rogers, Sheppard, Smith—14.

Nays—None.

Not voting—Alpers, Conrath, Whitney—3.

POTTSVILLE. PA., *May* 19, 1889.

Dear Sir: It is moved by Chas E. Dohme and seconded by S. A. D. Sheppard, that the sum of fifty dollars ($50.00) be appropriated by the Council for the expenses of the Committee on Membership, the same being an addition to the sum of two hundred dollars ($200.00) previously voted for the same purpose.

Please send your vote to the undersigned.

Yours, &c., GEO. W. KENNEDY,
Secretary of Council.

Yeas—Alpers, Caspari, Conrath, Diehl, Dohme, Eliel, Fennel, Ford, Good, Kraemer, Patch, Ramsperger, Rogers, Sheppard, Smith, Whitney—16.

Nays—None.

Not voting—Remington—1.

REPORT OF THE COMMITTEE ON ASSOCIATION PRIZES,

St. Louis, *August* 22, 1894.

To the Council of the American Pharmaceutical Association:

Your Committee to award the Association Prizes for Meritorious Papers, beg leave to report for the

First Prize, in favor of Charles Caspari, Jr., and Alfred R. L. Dohme, for their joint paper on "The Value of Titration with Volumetric Acid Solution as a Means of Assaying Alkaloidal Drugs and Galenical Preparations."

Seond Prize, to Henry Trimble and J. C. Peacock, for their paper "On the Preparation of Oak Tannins, with Reference to the Special Use of Acetone as a Solvent."

These papers present to us, in a very condensed form, the results of a considerable amount of valuable investigation in each case, and because of their practical value your Committee has decided in their favor.

J. M. Good,
W. J. M. Gordon,
J. H. Stein.

REPORT OF THE CHAIRMAN OF COUNCIL ON INVESTED FUNDS.

St. Louis, Mo., *July* 1, 1894.

The invested funds in the hands of the Chairman of the Council consist of the following:

Ebert Fund.

U. S. Registered 4 per cent. bond, $100.00, No. 160,603	$110 00
" " " " 500.00, No. 67,880	550 00
Cash, Savings Bank, Dover, N. H.	90 11
	$750 11

Centennial Fund.

U. S. Registered 4 per cent. bond, $1000.00, No. 145,640	$1100 00
" " " " 100.00, No. 160,604	110 00
Cash, Savings Bank, Dover, N. H.	187 83
	$1397 83

Life Membership Fund.

U. S. Registered 4 per cent. bond, $1000.00, No. 145,639	$1100 00
" " " " 1000.00, No. 145,761	1100 00
" " " " 1000.00, No. 145,762	1100 00
" " " " 1000.00. No. 150,826	1100 00
" " " " 1000.00, No. 150,827	1100 00
" " " " 1000.00, No. 150,828	1100 00
" " " " 1000.00, No. 164,185	1100 00
" " " " 1000.00, No. 164,889	1100 00
" " " " 1000.00, No. 173,049	1100 00
Cash, Savings Bank, Dover, N, H.	575 72
	$10475 72

General Fund.

American Security and Trust Co. 5 per cent. debenture bond, No. 26	$1000 00
" " " " " No. 27	1000 00
" " " " " No. 28	1000 00
	$3000 00
Total invested funds	$15623 66

J. M. Good, *Chairman of Council.*

REPORTS OF THE AUDITING COMMITTEE.

To the Council of the American Pharmaceutical Association meeting at Asheville, N. C., September 3, 1894 :

The undersigned Committee appointed by the Council of the American Pharmaceutical Association to examine the books and annual report of the Chairman of the Council, as also the invested funds of the Association, report same to be correct and agreeing with the books of the Treasurer.

Respectfully submitted,

CHARLES E. DOHME,
CHAS. CASPARI, JR.,
D. M. R. CULBRETH.

Baltimore, August, 1894.

To the Council of the American Pharmaceutical Association meeting at Asheville, N. C., September 3, 1894.

The undersigned Committee appointed by the Council of the American Pharmaceutical Association to examine the books and report of the Permanent Secretary, have performed the duties assigned them, and found the books and annual report of the Permanent Secretary to be correct and agreeing with the books of the Treasurer.

Respectfully submitted,

CHARLES E. DOHME,
CHAS. CASPARI, JR.,
D. M. R. CULBRETH.

Baltimore, August, 1894.

To the Council of the American Pharmaceutical Association meeting at Asheville, N. C., September 3, 1894.

The undersigned Committee appointed by the Council of the American Pharmaceutical Association for the purpose of examining the books and accounts of the Treasurer, have performed the duties assigned them, and report that they have found all entries correct, and the disbursements to correspond with the vouchers.

Respectfully submitted,

CHARLES E. DOHME,
CHAS. CASPARI, JR.,
D. M. R. CULBRETH.

Baltimore, August, 1894.

REPORT OF FINANCE COMMITTEE TO THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Gentlemen : It is the opinion of your Committee on Finance that a close scrutiny of the status of our resources should be made and a policy adopted that will insure a sound treasury and prosperity in the future. Your Committee begs leave to report that although the treasury shows a good balance on hand, there is a deficit this year of $1041.96 over and above the total amount collected for dues, and a deficit of $321.32 over and above the total income of the Association for this year, 1893.

Below are figures as taken from the books of the Treasurer:

Disbursements.		*Receipts.*		
1888	$5718.33.	1893.	From dues	$6810.00
1890	4015.15.	1893.	From sale of Formularies, Proceedings, interest, etc.	720.64
1892	6577.43.			
1893	7851.96.			
In all				$7530.64

This should not continue, and your Committee earnestly recommend a retrenchment of expenses, and a disavowal of the idea largely current that our Association is rich, and hence can afford to be extravagant. We are, to be sure, not insolvent, but if deficits accrue year after year, it is merely a question of time when we will become so.

In order to avoid a recurrence of such a preponderance on the wrong side of the cash-book, your Committee earnestly recommends:

1. That the total expenses be not allowed to exceed the amount of the income of the Association from dues alone.

2. That all Committees be careful to avoid any excessive expenditures.

3. That the different sections, scientific, legislative, commercial, etc., also bear this in mind when making recommendations for appropriations.

4. That delegates appointed by the Association to attend various conventions and meetings of other societies, associations, etc., bear their own expenses, or limit the amount to be paid by the Association to traveling expenses only.

5. That the Association earnestly endeavor through its Committee on Membership, as well as through every one of its members acting as a committee of one, to increase the number of its members and thus increase its income.

Respectfully submitted,
CHARLES E. DOHME,
WILEY ROGERS,
G. RAMSPERGER.

On motion of Jos. P. Remington, it was agreed that hereafter none of the official stationary, badges except the gold badge, or documents of any kind, bear the initials A. P. A.

On motion of S. A. D. Sheppard, David G. Plummer, of Bradford, Ill., was made a life member, old style.

The following amendments to the By-Laws were, upon motion of S. A. D. Sheppard, agreed to and recommended for adoption to the Association.

Amend Chapter V. Article 4, by adding the words, "Unless such meeting is held previous to Aug. 1."

Chapter VII, Article 1, strike out the word "six" in the first line, and insert the word "seven" in place thereof.

Strike out the words, "prize essays" in the third line and insert the words, "the Ebert prize, a committee on General prizes," so that the article when amended shall read as follows:

Article 1. There shall be seven standing committees. A Committee on Commercial Interests, and on the Revision of the Pharmacopœia, each to consist of five members.

A Committee on Scientific Papers, a Committee on the Ebert prize, a Committee on General Prizes and a Committeee on Pharmaceutical Legislation and Education, each to consist of three members; and a Committee on Transportation, to consist of nine members.

Amend Chapter VII, Article 6, by striking out in the first line the words, "prize essays," and insert the words, "the Ebert prize," in place thereof.

Add a new article to follow Article 6, which new Article shall read as follows:

Article 7. The Committee on General Prizes, which shall be appointed by the President, shall within six months after the annual meeting, at which the papers are presented, determine which, if any of them, are worthy of prizes, and decide upon the relative merits of such papers as are deemed worthy.

Change the numbering of articles 7, 8 and 9 of Chapter VII, so that said articles shall be 8, 9 and 10 of Chapter VII.

Amend Chapter VII, Article 8, by striking out in the fifth line the words "officinal and non-officinal" and inserting the words, "official and non-official" in place thereof.

Amend Chapter IX, Article XI, Section 9, by striking out the words "may be called up."

Amend Chapter IX, Article 12, by adding a new section, to be numbered 7, to read as follows:

Section 7. Incidental business.

Add to Article I, Chapter VIII, the words, "provided that no one, whose name has been dropped from the roll for non-payment of dues, shall be eligible for membership until payment has been made of the three years' dues for which he is in arrears."

The amendment to the Constitution proposed last year, to strike out in the second line of Article III. the words "a local secretary," and add to Article III. the words "also a local secretary to be elected by the Council," was, upon motion of S. A. D. Sheppard, endorsed and its adoption by the Association recommended.

On motion of President Patch, it was

Resolved, That the names of members reported by the Treasurer as in arrears for three years or more, sent to the Permanent Secretary just previous to the publication of the Proceedings for 1894, be dropped from the roll and published in said Proceedings.

Upon motion of Mr. Ebert, the minutes of Council were approved as read, after which Mr. Ebert, having obtained the floor, spoke as follows:

As to this matter of Finance, I am actually astonished. The officers having charge of our finances have come to us within the last few years and have made such reports of the magnitude and of the amount of money in our treasury that they have gone on and expended the money, and I am surprised at it. I have risen from my chair on several occasions and have asked the reason why this was done, and whether we could stand these expenses. Gentlemen, I speak feelingly, because I have gone through two crises of this Association when we were nearly bankrupt, and it was done in the same manner, and it is time to call a halt when we get into a condition of this kind. The idea of paying delegations their travelling expenses and other expenses that we cannot afford—these large delegation expenses exhaust our treasury—and I think the time has come, gentlemen, where we will get into a condition we will not like, and we do not want to get into that condition. We have gone through it twice.

Mr. Ebert then moved a vote of thanks to the Finance Commitfee for the valuable suggestions contained in their report.

Mr. Whitney: Before that motion prevails I want to modify it so as to include the Auditing Committee, and if Professor Remington will make the statement here before this body that he made before the Council, he will exhibit also the great wisdom of the Auditing Committee, I think, and relieve my friend Ebert. There is great necessity for it.

The President: Mr. Whitney moves that the motion be amended, and that the Auditing Committee be included in that vote of thanks. The amendment has been seconded, and the motion is, that we extend to the Finance Committee and the Auditing Committee a vote of thanks for the able report presented by the Finance Committee, and for the great care taken by the Auditing Committee in our accounts; and Prof. Remington is called upon for a statement in relation to the work of the Auditing Committee.

Mr. Sheppard: Mr. President, I fear that the remarks of our good friend, Mr. Ebert, may be misunderstood when he refers to what has been said in the past by our officers connected with the financial department. I do not think that we want the members to understand that this Association is bankrupt. The report of the Finance Committee was made at my suggestion, because it has seemed to me, in the last two or three years, that I have seen a tendency to overrun our expenses and to be extravagant. Every statement that has been made in the past has been as clear as this one, only there has never been in the past any over-statement of any kind. This Association is well-to-do financially now, and it has been for several years past; but there has been a very strong leaning towards running into extravagant ideas, and these expenses of this past year that we have just finished are the most notable examples of that fact that have come to our knowledge. I therefore felt it incumbent upon me to call the attention of the Chairman of the Finance Committee to that fact, and to ask him to look into the finances of the past year, and to see how our expenses were running up. He looked into the matter very thoroughly, and he fully agreed with me, and I feel that we are only adopting the ordinary conservative policy, and not in any way taking any back track in regard to, or condemning any of our statements of the past. I do not feel that this imputation, if I may so call it, by Mr. Ebert, is a just one. This report of our Finance Committee as to the present condition of things is simply calling a halt in a movement which was going a little too fast; we thought we were richer than we were, but we are not poor. I believe that he spoke at this time about bringing our expenses inside of the limit of the receipts of annual dues. That is one point wherein this Association will attain financial strength which it otherwise could not do, and which is a point which has not been fully considered up to this time.

Mr. Ebert: Mr. President, I wish to inquire of Mr. Sheppard how these excessive expenses were incurred, whether through the resolutions of the Association here, or by the Committee work? We did not exactly hear the report read back here, and we did not hear it very well, and I think if we are going to have a remedy, we ought to know where the fault lies.

Mr. Sheppard: When the report is made it will give the expenses for the year. There is no one item of great expense, but a general lifting up of our expenses. Of course, last year, we had one item of expense which was extraordinary—$454.00 being the expense of the International Congress, and another item of $250.00 for the expenses of the Committee on Membership, which we hope may bring a good return, and similar items all along the line. These two items were large items, but the general thought in this whole matter is the idea that we must not believe that because we are pretty well to do that we can afford to be extravagant. That idea has been gaining ground for the last few years. I think that is the thought of the Finance Committee in bringing this matter to a point now.

Mr. Ebert: The reason why I made this statement was this: At our last meeting there was a proposition made for more prizes, and I stood up in my seat and I asked the Treasurer in these very words, "Are we able to go on and meet these extra expenses;" and I very positively remember his laughing at me, and his answer, "We are." That is one of the items. I know that these things have been going on, and I think it is the duty of the Treasurer, and I think it is the duty of the men who have charge of our funds, to be very careful that we do not get into the condition that we have been in, where it has been difficult to get out again.

Mr. Sheppard: If Mr. Ebert asked me that question, it was answered squarely as I always answer: "Yes, this Association can afford to appropriate $150.00 for prizes for scientific work, as that is the prime object of the Association." If we do anything let us cut off the salaries, and don't cut off the appropriations for scientific work.

The President: If there is no objection, we will listen to some remarks from Prof. Remington.

Prof. Remington: Mr. President, I have been requested to make a statement with regard to the work of the Auditing Committee, and I very cheerfully do this, for I have had an insight in the past year into more of the details of the work of the Association than I have ever had before in all my experience with the Association in years past, and that particularly with the Auditing Committees, when the course has been that the accounts of the Treasurer and the Permanent Secretary were necessarily gone over in a perfunctory way—it had to be under the old order of things. The accounts were brought here and the books were given to the Committee, who had possibly an hour, and sometimes less than that, to go over these very voluminous accounts, and necessarily they could not give to the Association a correct statement as to how the Association stands; and when I tell you, members of the Association, that the Auditing Committee found a little difference of $1.50 between the accounts of the Treasurer and myself, and they overhauled the books, that taking them four days, going over everything in order to find out where this discrepancy was, and at last found that the $1.50 from a former account had been transferred to the succeeding account, going from one book into another. From this you may form some idea of the thoroughness with which this Committee does its work. I felt it was only due to the Association as I have obtained this information—it was only due this Association to know that you have an Auditing Committee and a Finance Committee that are not satisfied with perfunctory work, but they go over it in detail and are bound to probe everything to the bottom, and to see that everything is right; and I believe, Mr. President that is why this report has been presented in the shape which you see it, and that it has been on that account, that the matter has been gone into so thoroughly by the Finance Committee; and it only shows that the Finance Committee are watchful, and that while there is no occasion for alarm whatever on the part of the Association, it shows the watchful care they have exercised in looking after finances. (Applause.)

THE PRESIDENT: That ought to be an answer to the last motion and question. After what you have heard we will take a vote upon the question.

The question being on the motion of Mr. Ebert as amended by Mr. Whitney, it was unanimously agreed to.

Reports of Committees being called for, they were read by title as follows:

On the Revision of the United States Pharmacopœia—H. M. Whelpley, Chairman.

On International Pharmaceutical Congress—O. Oldberg, Chairman.

On Centennial Fund—J. M. Good, Chairman.

On Transportation—C. A. Mayo, Chairman.

Delegates to the Section on Materia Medica and Pharmacy of the American Medical Association—W. T. Wenzell, Chairman.

Delegates to the Pan-American Medical Congress—W. S. Thompson, Chairman.

The next business in order being the formation of a Committee on Nominations, the President directed the members present from each State to select two of their number to represent them on the Committee.

A recess of ten minutes was taken, after which the roll of States being called, the following Committee was appointed:

Alabama—P. C. Candidus, C. H. Mohr.
Arizona—C. L. Eshman.
Arkansas—Dr. Anderson.
California—R. G. Eccles.
Colorado—A. W. Scott, C. M. Ford.
District of Columbia—W. S. Thompson, A. M. Read.
Delaware—John M. Harvey.
Florida—S. P. Watson.
Georgia—John Ingalls, G. F. Payne.
Illinois—Geo. C. Bartell, A. E. Ebert.
Indiana—J. N. Hurty, Frank Carter.
Kansas—L. E. Sayre.
Kentucky—C. L. Diehl, Geo. A. Newman.
Louisiana—F. E. Royer, J. A. Legendre.
Maryland—Chas. E. Dohme Wm. Simon.

Massachusetts—Henry M. Whitney, F. H. Butler.
Michigan—Geo. McDonald, J. O. Schlotterbeck.
Missouri—J. M. Good, H. M. Whelpley.
New Jersey—Geo. W. Parisen, Wm. C. Alpers.
New York—A. H. Mason, J. Pfeiffer.
North Carolina—H. R. Horne, F. W. Hancock.
Ohio—T. L. A. Greve, Geo. B. Kauffmann.
Pennsylvania—Wm. McIntyre, E. C. Cornell.
South Carolina—O. E. Thomas, H. Plenge.
Tennessee—R. W. Vickers, J. O. Burge.
Texas—L. Myers Conner.
Virginia—T. Roberts Baker.
Wisconsin—John A. Dadd.
Canada—J. E. Morrison.

The President appointed the following five members at large on the Nominating Committee:

W. J. M. Gordon, of Ohio.
A. K. Tilden, of Massachusetts.
M. W. Alexander, of Missouri.
Thomas J. Casper, of Ohio.
Wm. Simpson, of North Carolina.

Mr. Fennel: It devolves upon this Association to elect a Permanent Secretary. The Constitution, Article III., says:

"Article III. The officers of the Association shall be a President, three Vice Presidents, a Permanent Secretary, a Local Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually, and shall hold office until an election of successors."

In view of that, I thought it would be best to make an exception in the election of the Permanent Secretary, and to instruct your Committee on Nominations to nominate all the officers with the exception of Permanent Secretary, and make the election of Permanent Secretary by the Association at large. I make this as a motion.

The President: You have heard the remarks of Prof. Fennel. It seems to me that the Nominating Committee can bring in the name of any candidate—the election is by the Association. Is this resolution seconded?

The resolution was seconded by several.

Mr. Alexander: I am opposed to this movement absolutely, and wish to speak against it. If we are going to have an election of this house, let us do away with the Nominating Committee entirely, and let us elect our President, Vice-Presidents, and all our officers in open meeting. It may be a fairer way of doing the thing than by having some few go into the Nominating Committee, just a few, who will represent all the States. That is not the question at all—we will come here to-morrow morning on the election of Permanent Secretary, and I am opposed to it unless you take every officer and elect them in a general convention; if you do, we will be here just one week in electing our officers. This has been tried. We have tried to elect our officers in open convention. The By-Laws prescribe the appointment of a committee to nominate the officers of the Association, and it is their duty to nominate the officers of this convention, and then they go out and come in with the report as to the officers that they recommend. This convention need not take those officers; anybody can nominate another man. This is not binding upon them.

Mr Ebert: It has been done in that way.

Mr. Alexander: I admit that it can be done in that way to-morrow, but you violate the By-Laws of this Association and go against a tradition of this Association which has existed for nearly forty years; and the taking of the nominations from the Nominating Committee I am opposed to.

THE PRESIDENT: If the Association will permit me to say a word, I would have ruled that it was out of order for me to entertain a motion of this sort, because our By-Laws provide for this Nominating Committee to bring in a list of officers, and when they bring in that list other nominations can be made. It seems to me that we should not waste time on this motion. Our officers must be elected under our Constitution and By-Laws.

MR. ALEXANDER: We have never done otherwise, but upon occasions we have not accepted the report of the Nominating Committee.

THE PRESIDENT: I shall rule as I would have ruled—I entertained the motion as a matter of courtesy, and I think I should be right in ruling it as entirely out of order.

PROF. FENNEL: I think my friend, Mr. Alexander, is altogether wrong; it is only a matter of form, and it says in the article I have read all the officers shall be elected except that one, and therefore I do not think we are violating any precedent.

THE PRESIDENT: If the Professor will allow me, there would be no occasion for the election for Permanent Secretary while the office was filled; in this instance we have no Permanent Secretary, consequently it devolves upon the Nominating Committee to present the names for that office.

THE PRESIDENT: I am also requested by the members of the Nominating Committee to state that the Committee will have its meeting for organization in this room at 8 o'clock to-night, while the committee on the time and place of meeting will meet directly after our adjournment. Now if you will kindly give attention to the reading of these letters of invitation which have been received from various places, they can now be read.

The Secretary then read the following invitations to meet in Montreal and Denver in 1895.

DENVER, COLO., *August* 22, 1894.

To the Officers and Members of the American Pharmaceutical Association.

Gentlemen: The Colorado Pharmacal Association hereby sincerely extend you a cordial invitation to hold your next meeting in Denver. Should you see fit to honor our city with your presence in '95, nothing will be left undone to make your sojourn in the State and city one long to be remembered.

Respectfully yours,
JUDSON W. TURRELL, *President.*
CHAS. S. KLINE, *Secretary pro tem.*

DENVER, COLORADO, *August* 10, 1894.

Officers and Members of the Pharmaceutical Association:

Gentlemen: In behalf of Colorado and Denver, the Chamber of Commerce, composed of 600 of its most prominent citizens, hereby extend a most cordial invitation for you to hold your convention of 1895 in this city. Denver is becoming the great convention city of America, largely because of her magnificent climate, superior hotel accommodations, of her great daily newpapers, of the unstinted hospitality of her people, and being a great railroad centre. Situated as it is on the broad plains at the base of and in the very shadows of her snow-capped mountains, which form a grand panoramic, scenic view, visible to the naked eye for over 250 miles; easily accessible to the grandest mountain scenery on the continent, and the great gold and silver mines of the Rocky Mountains, Denver has many attractions, which must be seen to be appreciated, and should you do us the favor to locate your next convention in this city, we can promise your members in advance that they may expect royal treatment at the hands of our citizens.

Very respectfully yours,

DENVER CHAMBER OF COMMERCE AND BOARD OF TRADE.

By EDW. B. LIGHT, *Secretary.*

DENVER, COLO., *August* 21, 1894.

To the President and Members of the American Pharmaceutical Association in Convention assembled:

Gentlemen: At the last regular meeting of the Denver Pharmaceutical Association, a resolution extending to you, through our delegate, Mr. Chas. M. Ford, a unanimous invitation to make our city the choice of your next meeting, was adopted.

We, therefore, extend to you our earnest desire to have you come to our city next year, and can assure you that hospitable cordiality that only Denver can extend to her guests.

Mr. Ford will be only too glad to give you any information regarding the superiority of our city and state.

This Association extends to you, also, its kindest greetings, and best wishes for a successful meeting in Asheville.

Any courtesies extended to Mr. Ford, will be sincerely appreciated by this Association.

CHAS. D. BARNES, *President.* Sincerely, F. M. HALL, *Secretary.*

MONTREAL, *August* 23, 1894.

J. P. REMINGTON, ESQ., *Permanent Secretary American Pharmaceutical Association:*

Dear Sir: I am instructed by the Council of the Pharmaceutical Association of the Province of Quebec and the Board of the Montreal College of Pharmacy, on their joint behalf, to extend to the American Pharmaceutical Association a very cordial invitation to hold their next annual meeting in the city of Montreal. I need not here expatiate upon the beauties of our city and its surroundings, and the attractions of the river approaches to it, especially for our western friends, but will leave that duty to our representative, Mr. Morrison, who will be present at your meeting as delegate from both our pharmaceutical bodies; but one thing I think I can assure you is, that should your Association accept our invitation, those coming here will receive a hearty welcome, and we will try to make it pleasant for all, Montreal being somewhat noted for its hospitality.

Temporary arrangements have been made with our leading hotels for reduced rates, and I have little doubt our railroads will also make the usual concessions: of these details Mr. Morrison will give you particulars. I also desire to inform you that should our invitation be accepted, Mr. Joseph E. Morrison has been unanimously selected by the pharmacists of this city to fill the position of local secretary here. I regret very much that I will be prevented from being present at your Asheville meeting, but I trust you may have a pleasant and successful gathering.

With kind regards, I remain yours sincerely,

E. MUIR, *Secretary.*

Dr. J. M. Anderson verbally renewed the invitation of last year by the Arkansas Pharmaceutical Association to meet at Hot Springs, Ark.

The President then appointed the following Committee on Time and Place of Next Meeting: Chas. E. Dohme, J. E. Morrison, C. M. Ford, J. M. Good and S. A. D. Sheppard, and also announced the names of the gentlemen composing the Committee on Association Prizes as follows: H. Kraemer, of New York; W. L. Scoville, of Boston, and C. S. N. Hallberg, of Chicago.

Mr. Kennedy, Secretary of the Committee on Membership, next read his report, which had previously been approved by Council. The report was accepted and referred to the Committee on Publication.

REPORT OF THE COMMITTEE ON MEMBERSHIP.

To the Chairman and Members of the Council of the American Pharmaceutical Association:

Gentlemen: As Secretary of the Committee on Membership, in conformity with requirements of the Association, I herewith transmit my report for your disposal.

As soon as it was possible for your Secretary to attend to the duties of the office after adjournment of the last meeting held in Chicago, the ordinary invitation was sent to each one of those invited to complete their membership by signing a blank form, which was also mailed at the same time. One hundred and ninety gentlemen were recommended in compliance with the By-laws to become members of our Association; of this number one hundred and thirty-three (133), about 70 per cent., have completed their membership by complying with the requirements, which certainly shows a good average increase when compared with other years. This number is credited to thirty-three (33) states, two (2) territories, District of Columbia, Canada and Central America. You will observe that nearly all parts of our country have contributed to increase our growth. Since the publication of the Proceedings for 1893 the following named gentlemen, whose names do not appear on the rolls, have become members: Frank L. Way, Manchester, N. H.; Geo. F. Payne, Atlanta, Ga.; and J. H. Eichberg, of Cincinnati, O.

The Treasurer, Mr. S. A. D. Sheppard, has presented me with a list of forty-six names of members who are in arrears and who are liable to be removed from the rolls of membership, unless their indebtedness is liquidated by the time the next volume of Proceedings is issued.

At the meeting of the Association held last year the following resolution was adopted (see Proceedings, page 65), "That the President be instructed to appoint a Special Committee on Membership, to consist of one member from each State and Territory and one each from the District of Columbia, Nova Scotia, Ontario and Quebec, the duty of said committee to be that of soliciting new members in their respective sections of the country and to report the same to the Secretary of the Committee on Membership." In compliance with the above resolution, the President appointed the following committee:

Special Auxiliary Committee.

Alabama—P. C. Candidus, Mobile.
Arizona—Clemens L. Eschman, Phoenix.
Arkansas—W. W. Kerr, Russelville.
California—Prof. W. M. Searby, San Francisco.
Canada, Province Ontario—John Lowden, Toronto.
Canada, Province Quebec—S. Lachance, Montreal.
Colorado—Chas. S. Kline, Denver.
Connecticut—Chas. A. Rapelye, Hartford.
Delaware—John M. Harvey, Wilmington.
District of Columbia—Sam'l L. Hilton, Washington.
Florida—Henry C. Cushman, Pensacola.
Georgia—Henry R. Slack, La Grange.
Idaho—A. O. Ingalls, Murray, Shoshone Co.
Illinois—T. H. Patterson, Chicago.
Indiana—Josiah K. Lilly, Indianapolis.
Iowa—Mrs. Rosa Upson, Marshalltown.
Kansas—Mrs. M. O. Miner, Hiawatha.
Kentucky—Dr. Wiley Rogers, Louisville.
Louisiana—A. K. Finlay, New Orleans.
Maine—Edw. A. Hay, Portland.
Maryland—Prof. D. M. R. Culbreth, Baltimore.
Massachusetts—Prof. W. L. Scoville, Boston.
Michigan—A. S. Parker, Detroit.
Minnesota—Jas. C. Henning, Stillwater.
Mississippi—J. C. Means, Natchez.
Missouri—Prof. H. M. Whelpley, St. Louis
Nebraska—Jas. Reed, Nebraska City.
Nevada—W. A. Perkins, Virginia City.
New Hampshire—A. C. Preston, Portsmouth.
New Jersey—Geo. W. Parisen, Perth Amboy.

New Mexico—Jas. O. Kinnear, Demming.
New York—C. M. Mayo, New York.
North Carolina—Henry R. Chears, Plymouth.
Nova Scotia, New Brunswick and Prince Edward's Island—F. C. Simson, Halifax.
Ohio—Louis C. Hopp, Cleveland.
Oregon—Geo. C. Blakeley, The Dalles.
Pennsylvania—Prof. F. G. Ryan, Philadelphia.
Rhode Island—Henry J. Alfreds, Providence.
South Carolina—
South Dakota—I. H. Keith, Lake Preston.
Tennessee—J. O. Burge, Nashville.
Texas—L. Myers Conner, Dallas.
Utah—Frank A. Druehl, Salt Lake City.
Vermont—H. A. Chapin, Brattleboro.
Virginia—E. R. Beckwith, Petersburg.
Washington—G. Kellog, Seattle.
West Virginia—E. L. Boggs, Charleston.
Wisconsin—John A. Dadd, Milwaukee.
Wyoming—Dr. Thos. G. Maghee, Rawlins.

The Chairman of the Committee, Chas. Caspari, Jr., in conjunction with the Secretary of the Committee on Membership, prepared the following circular:

The American Pharmaceutical Association.

Dear Sir: The Committee on Membership desire to call attention to the following circular, containing some extracts from the Constitution and By-Laws.

The aim of the Association is to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulteration.

2. To encourage proper relations between Druggists, Pharmaceutists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing, and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

Every Pharmacist and Druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, who after duly considering the objects of the Association and the obligations of the Constitution and By-Laws, is willing to subscribe to them, is eligible to membership.

The business of the Association, which is not of a scientific character, between the times of meeting, is in charge of a Council composed of 17 members; the acts of said Council, however, are subject to revision by the Association.

The annual dues payable by each member are $5.00, and this is the only expense connected with membership (initiation fee not being required) unless a certificate of membership is desired, which can be procured from the Treasurer upon payment of $5.0c.

Aside from the enjoyment of pleasant social features which form a part of the annual reunions of the Association, personal attendance at the meetings is amply repaid by the opportunity of participation in the discussions of the numerous scientific, commercial and legislative matters brought before the different Sections.

Every member in good standing is entitled annually to receive gratuitously a bound volume of about 1,000 pages or more, containing a full account of the proceedings of the annual meeting, including the various papers read and discussed and also the Report on the Progress of Pharmacy, which latter is recognized as a most valuable addition, being a thorough digest of every thought and labor in the pharmaceutical world. This volume, which is carefully compiled by the Permanent Secretary of the Association, is alone worth the amount of the annual contribution, and in the course of years becomes a most important part of the pharmacist's library.

Organized in 1852 with 18 members, the Association now has a membership of over 1,600, but even this number represents only a small percentage of those actively engaged in the field of pharmacy. By special resolution, the annual meetings are held alternately in large cities and desirable country resorts, thus affording a most agreeable variety for recreation. During the past 40 years all sections of the country have been visited, from Toronto to New Orleans and from New York to San Francisco. This year the Association will meet during the month of September at that most delightful mountain resort, Asheville, North Carolina, so well and favorably known to all tourists. It is hoped that a large attendance of new members will be present.

Any member of the Committee will be glad to give additional information if desired.

All applications for membership must be accompanied by the amount of one year's dues ($5.00) in advance, and should be so forwarded to the Secretary of the Committee on Membership, Geo. W. Kennedy, Pottsville, Pa. If more convenient they may be sent through the Special Members of the Committee appointed for the respective States and Provinces.

Ten thousand of the above circulars were printed, with the same number of blank applications and stamped envelopes, which were sent to each member of the Auxilliary Committee on Membership, the division being made according to the number of druggists in each State, etc. What the result of this labor and expense will be I am unable to say at this writing; if it does not, it should show a large addition of new members to our rolls, as each member labored hard with this object in view.

Report of Membership.

Members in good standing at last report	1 493
Members elected since last report	124
Members received as delegates	9
Total membership	1,626

Loss in Membership.

By resignation	53	
By death	23	
Dropped from roll for various causes	26	
Total loss		102
Members in good standing at this report		1,524

Honorary Membership.

Number on the roll at last report	19
Loss by death	1
Number on the roll at this report	18

I have thus concisely gone over the work of another year, with the exception of performing the sad duty of announcing the names of the departed with obituaries. I would be glad could I close my report without the necessity for a reference to the diminution of our numbers by the visitation of the Divine hand. But alas! the grim reaper has been unusually busy in his invasion of our ranks during the year that has gone. It behooves us to read with solemn thoughts the admonitions that come to us in these added proofs that in the midst of life we are in death. While nearly all of those who have been called away were closely allied to us in friendly and fraternal bonds, the death of one of these in particular, who was for many years my close personal and professional friend, touches in me a chord of feeling that makes even a reference to his decease, an effort almost beyond my power—I refer to our honored associate, the late Prof. John M. Maisch. I need not speak of his loss to this Society. His services cannot be told in a brief obituary notice. They were incalculable. The professional and scientific world may indeed mourn the loss of one of its brightest stars. That loss has been already felt in every capacity in which Prof. Maisch labored. But to me the loss is more than a professional one. I knew him as a friend and companion, and knew him well, and I know that few men possessed more of the qualities that make nature's noblemen than did my dear departed friend, and my wish is that I may be able to in part emulate those noble qualities, and share in a proportion of such noble work in the world.

The names of those who have died since our last meeting are as follows, some of these appear on the list of deceased members in the last Proceedings, page 1057:

Prof. Robert Bentley, London, England.
Godfrey Borrell, New Orleans, La.
Charles E. Bristol, Ansonia, Conn.
Joseph Burnett, Boston, Mass.
P. H. Butler, Vernal, Utah.
Daniel S. Fox, Reading, Pa.
Henry C. Gaylord, Cleveland, O.
J. Thomas Hoskinson, Philadelphia, Pa.
Walter H. Howson, Chillicothe, O.
John Johnson, New Orleans, La.
S. S. Jones, Wilkes-Barre, Pa.
Samuel Kidder, Lowell, Mass.
William B. Krosscop, Oil City, Pa.
F. A. Lyneman, Denver, Col.
John M. Maisch, Philadelphia, Pa.
Hugo W. C. Martin, Chicago, Ill.
Theodore Metcalf, Boston, Mass.
James H. Munson, Philadelphia, Pa.
Elisha H. Perkins, Baltimore, Md.
Edward C. Pfingst, Louisville, Ky.
Jno. C. Scribner, Angels Camp, Cal.
George E. Shiels, New York City.
J. W. Tomfohrde, St. Louis, Mo.
Wm. L. Vennard, New York City.

Prof. Robert Bentley, of London, England, an honorary member of our Association, died December 24th, 1893. He was born in 1821. He was associated with the Pharmaceutical Society of Great Britain from the time of its foundation, first as student, and then as Professor of Botany, until 1887, when he was elected Emeritus Professor. In 1866 he was elected President of the Pharmaceutical Conference at Nottingham. For many years he acted as Chairman on the Garden Committee of the Royal Britannic Society, Regent's Park, and annually gave the fellows a course of lectures on botany. Outside of the Pharmaceutical Society, Professor Bentley occupied the Chair of Botany and Dean of the Medical School at Kings College, and the Chair of Botany at the London Institution. His "Manual of Botany" passed through several editions, the last, in 1887, being the most complete. Professor Bentley was probably best known in this country through Bentley and Trimen's "Medical Plants." This work has been, and will continue to be, a standard authority in America. On account of the elaborate colored plates, however, its expense places it beyond individual libraries, but it is none the less sought after and consulted. He was elected an honorary member in 1872, at the meeting held in Cleveland, Ohio.

Godfrey Borrell, of New Orleans, La., died June 1st, 1893, after a short illness. He was born March 16th, 1857. After serving a regular apprenticeship to the drug and apothecary business, he went into business for himself at New Orleans, which he conducted with success for seven years prior to his death. He had resided in New Orleans twelve years. He was a member of the Louisiana State Pharmaceutical Association. He was married and a wife and daughter survive him. Deceased became a member of our Association at the meeting held in the city of New Orleans in 1891.

Charles E. Bristol, of Ansonia, Conn., was born in the town of Derby, Conn., December 21st, 1847. He received a common school education and early in life entered the drug business. He was engaged in the same in his native town (now the city of Ansonia) for twenty years, and was well-known as a pharmacist for reliability throughout the state. For many years he was in business on his own account, and was very successful in every respect. He held many offices of trust in the town where he always resided, with credit to himself. The most prominent of these was the office of postmaster, the duties of which he discharged for sixteen years with marked ability. He joined the Connecticut Pharmaceutical Association in 1877, and was one of its most valued members. He died in Ansonia, May 25th, 1892, universally respected by his townsmen and a large circle of friends. Deceased became a member of our Association at Saratoga Springs, N. Y., in 1880.

Joseph Burnett, of Boston, Mass., died at his country seat, "Deerfoot," August 12th, 1894, the result of injuries received by being thrown from his carriage at Marlboro Junction. He was born at Southboro, November 11th, 1819, and died at the age of 73 years and nine months. He was one of four children of Charles and Keziah Burnett, and passed the early years of his life in the old Burnett homestead near Southville. Mr. Burnett received his earlier education in the district schools of his native town. When about 15 years of age he left his home and went to Worcester, where he remained until his 21st year. He attended the English and Latin schools of that city. He studied and graduated in medicine, but never practiced it. In 1837 he associated himself with Theodore Metcalf, the Boston druggist, as clerk, and in 1854 left that house, having become a partner in the concern in the meantime, and, disposing of his interest, entered the manufacturing chemical business on Central street. The flavoring extracts and other products of this manufactory have acquired world-wide fame. The old stand at No. 27 Central street has been known in this connection for over 40 years. Dr. Burnett was a man of broad and sympathetic nature, a humanitarian in the best sense of that word, and withal a man of energy, of action, and of true public spirit. He filled a large place in the busy world of trade, and his influence was felt far and widely in those other relations between man and man which are concerned in good citizenship. And Dr. Burnett was a good citizen with all which that title implies. In his relations with his employees, in his regard for the public welfare, in the example which he set of high integrity and of open-handed generosity, he lived a life of which the memory is unclouded. He had served on the Southboro School Board, and was the first road commissioner of that town. He was Chairman of the Building Committee of the Town Hall. His death is a loss to the community, not alone of the little town of Southboro, but of a far wider public. In 1847 Mr. Burnett married Miss Josephine Cutter, daughter of Edward and Ruth Cutter, of Boston, and she survives him with three children. Dr. Burnett was one of the founders and a life member of our Association.

Dr. P. H. Butler, of Vernal, Utah, died there very suddenly, August 25th, 1892, aged thirty-four years. After receiving a good common school education, he began the study of medicine by entering one of the medical colleges, from which institution he graduated. He located at Vernal, Utah, and in connection with his practice he opened a drug store, which he continued up to the time of his death. Deceased became a member of our association in 1892, at the meeting held at the Profile House, N. H.

Daniel S. Fox was born in the city of Reading, Pa., on March 22, 1842. His father was Frederick Fox, a well-known business man. He was educated in the public schools of Reading, and attended institutions at Birdsboro, Pa., and Danbury, Conn. Fond of experiments in chemistry and being of a scientific turn of mind, he early took a liking to the drug business. He graduated from the Philadelphia College of Pharmacy in 1863. His preceptor was Henry A. Boner, Sixth and Green streets, Philadelphia. After remaining in Philadelphia for some time he accepted a situation in the large establishment of Kidwell & Co., in Washington, D. C., where he remained until the close of the war and for several years thereafter. He subsequently clerked in Philadelphia and Reading. Soon after the great fire in Chicago he went to that city, where he resided for a number of years. He was head prescription clerk in the establishment of Buck & Rayner, State and Madison streets, and afterward had charge of a drug store on the West Side. While a resident of Chicago he met with an accident which resulted in a disease of the spinal cord. After visiting several health resorts and trying mineral baths and electrical treatment, he returned to Reading in declining health. He designed and fitted out the drug house of H. H. Kneedler & Co., Fourth and Penn streets, Reading, where he remained until his eyesight failed him. For the last five years of his life he was blind and a great sufferer, owing to his paralytic and helpless condition. His mind, however, remained as bright and clear as ever until his death, which occurred on the morning of September 5th, 1893. Deceased was thoroughly wedded to his profession, and occasionally contributed to a number of pharmaceutical journals. He had a valuable library of pharmaceutical and medical works, and kept himself constantly abreast with all the latest developments in chemistry and pharmacy. His knowledge of German and French was a great aid to him in that respect. As a druggist he stood in the front rank. He was generous and warm-hearted and always ready to extend a helping hand to those in need of aid. He was never married. His funeral took place from the residence of his brother, Cyrus T. Fox, Reading, on September 8th, and the interment of his remains was made in the family burial plot in the beautiful Charles Evans Cemetery, by the side of his parents, who had preceded him in death by only a year or two. The pall-bearers were graduates of the Philadelphia College of Pharmacy. Deceased was a life member of our Association, having been elected in 1872 at the meeting held in Cleveland, Ohio.

Henry C. Gaylord, of Cleveland, Ohio, died there September 29th, 1893. He was born in Connecticut, October 21st, 1826, and at the age of seven moved with his parents to Cleveland, Ohio, at which place he resided up to his death. His degree of A. B. was taken at the Western Reserve University, Hudson, Ohio, in 1845, and the degree of A. M. was obtained three years later, in 1848. For several years he was in the wholesale drug business with his father, Erastus F. Gaylord, leaving him only to engage in the retail business, in which he was at the time of his death. He was a member of the Beta Theta Pi college fraternity, the Kirtland Society of Natural Sciences, and of the Ohio State Pharmaceutical Association. The deceased was a profound student, and devoted his energies rather to the scientific than the business side of his vocation. At one time he became interested in microscopy and was then connected, in one capacity or another, with several of the microscopical societies of this country and Europe. Deceased connected himself with our Association in 1869, at Chicago, Ill.

John Thomas Hoskinson, of Philadelphia, died at his late residence, northwest corner of Front and Norris streets, July 29th, 1893, aged forty-three years. He was born at Chambersburg, Pa., learned the drug and apothecary business with the late Daniel S. Jones, and graduated from the Philadelphia College of Pharmacy in 1871. He was in active business at Front and Norris streets for several years. He was a member of the Executive Board of the Alumni Association, of which he was an active member. He was also a member of the Pennsylvania State Pharmaceutical Association, in both of which he took an active interest, attending their various meetings. He was considered an honest and conscientious pharmacist, and had an excellent reputation in the vicinity in which he resided for dispensing only pure drugs and chemicals. Deceased connected himself with our Association in 1881, at the meeting held in Kansas City, Mo.

Walter H. Howsen, of Chillicothe, Ohio, died of Bright's disease, March 7th, 1874. Deceased was born in Sheffield, England, in 1845. His parents emigrating to this country early in the '50's, his training and education were almost American. In 1872, he chose pharmacy as his occupation, in which he continued until his death. Though uncommonly modest and unassuming in his manner, he soon became well known in his profession as a close student, and especially careful and conscientious in practice. He was an omnivorous reader, both of general literature and science, and especially studious of the literature of pharmacy; and for many years prior to his death was recognized as one of the best equipped, most intelligent and most reliable pharmacists of the ancient metropolis. He was universally respected in the community in which he lived, as a man of honor and integrity, and as an ornament to his chosen profession. Mr. Howsen became a member of our Association in 1875, at Boston, Mass.

John Johnson, of New Orleans, La., died December 1st, 1892, aged 40 years. Deceased was a native of Denmark. On his arrival in the port of New Orleans, he was placed in the hospital for surgical treatment, and upon being restored to health he obtained employment in the dispensary of that institution, which thereafter became the scene of his professional labors and his permanent abode. Under the able instruction of Mr. Lasker, who was then in charge of the dispensary, he made rapid progress in the study of pharmacy, and upon the resignation of that gentleman in 1872, he was appointed to the position, and discharged the duties thereof to the entire satisfaction of all concerned for twenty years. From the first he evinced a great fondness for the study of chemistry, to which he closely applied himself. Endowed by nature with a retentive memory and stimulated by an incessant desire for the pursuit of knowledge, coupled with untiring industry, he soon became so proficient in analytical chemistry that his services in that branch were secured in many important cases. He was a member of the Louisiana State Pharmaceutical Association, which he joined the first year of its existence. He served as Chairman of the Executive Committee for several years, and was unanimously elected President at the meeting of 1891. The literature of the Association is adorned by several papers which bear his signature. They display originality of thought and impart valuable information, and were written and delivered in a style peculiarly his own. He was a man of remarkable personal characteristics; native modesty and dislike of notoriety being not the least salient. Though of a retiring disposition, he was ever prompt to participate in the discussions of the meetings, and possessed the happy faculty of saying in a terse and graphic way, the right thing at the right time. Deceased became a member of our Association at the meeting held in the city of Cincinnati, Ohio, in 1887.

S. S. Jones, of Wilkesbarre, Pa., was born June 16th, 1864, and died of yellow fever, March 12th, 1894, at Rio de Janeiro, Brazil, South America. After receiving a good common school education he began the study of pharmacy with N. Wolf, of Wilkesbarre, Pa., and subsequently went to Philadelphia, where he accepted a situation as drug clerk, and entered the Philadelphia College of Pharmacy, from which institution he graduated in 1886. He returned to Wilkesbarre, and entered the pharmacy of N. Wolf as head clerk, which position he held for several years, when he was taken by Mr. Wolf as partner, under the firm name of Wolf & Co. The business was conducted for several years. Mr. Wolf finally retired from the business, when Mr. Jones became sole proprietor, which he conducted for some time. Owing to failing health, he went South in search of lost strength, but was stricken down with that dreadful disease, as stated above, from which he never recovered. He was married in 1891 to Margaret W. Williams, of Wilkesbarre, whom he leaves to mourn his loss. Deceased became a member of our Association, in 1887, at Cincinnati, Ohio.

Samuel Kidder, one of the best known citizens of Lowell, Mass., died February 15th, 1894, at his home, 55 Nesmith St., at the age of 72 years. Mr. Kidder was born in

Charlestown, and went to Lowell in 1843. He had previously been in the drug business as a clerk for his father in Charlestown. In company with a partner named Walker he bought out the drug store at the corner of Merrimac and John streets, of Christopher Skelton. He subsequently became sole proprietor, and remained in business at the same stand until 1865, when he was superseded by F. & E. Baily, who had learned the business with him. Upon leaving the business, Mr. Kidder became partner in the firm of Page, Kidder & Co., dealers in flour and grain, and later continued the business at the same stand in company with Jacob Coggin, under the firm name of Coggin & Kidder. He retired from business several years ago, and has lived quietly since. The immediate cause of his death was heart disease. His surviving family consists of five daughters. He was vice-president of the Lowell Institution for Savings, director of the Wamesik National Bank, and a member of the Old Residents' Association. Deceased was an upright, unobtrusive citizen, who devoted himself strictly to business, and had no ambition for public office. He was one of the many citizens of Lowell who will be remembered as a shining example of strict mercantile integrity, whose character will always be remembered with pride. He was one of the oldest members of our Association, having connected himself in 1859, at the meeting held in Boston.

William B. Krosscop, of Oil City, Pa., died at his home March 3d, 1894, after a short illness, in his 51st year. He was born in Lancaster, Pa., July 18th, 1843. He went to the public schools until he was fifteen years old, having received a fair education. He was employed as roll-keeper and pay-clerk in a large match factory in Lancaster. In In the year 1862 he began the study of pharmacy in his native city with Mr. Chas. A. Heinitsh, with whom he remained until 1865, then went to Philadelphia to further prosecute his pharmaceutical studies, and was employed as a drug clerk in that city for some years, after which he removed to Parker's Landing during the coal oil excitement, and was employed in a drug store for several years. He finally opened a store for himself, and was very successful in this undertaking; after a few years he sold out and removed to Oil City, at which place he opened a new store and was quite successful. Having a fondness for traveling, he made several trips to Europe, the Orient, and South America and Mexico, and at the time of his death was preparing to make an extended trip of the United States. Deceased became a member of our Association in 1887, at Cincinnati, Ohio.

F. A. Lyneman, of Denver, Colorado, died in Denver, June 19th last, from a stroke of apoplexy, He had been in his usual good health up to the day of his death. He complained of a slight headache and pain in left side, but neither he nor his family were alarmed by it. Just before dressing to go down stairs to his breakfast he entered the bath-room and was found shortly after by his wife just as he was stricken and unconscious, and lived only a few hours afterwards. The deceased was a graduate of the Philadelphia College of Pharmacy and a member of the Alumni Association of the same College. He was a member of the Colorado Pharmacal Association, and Secretary of it since its organization. He was proprietor of two pharmacies in Denver at the time of his death, and was one of the most genial, kind-hearted and loyal of men. He was 37 years of age, and was a native of Richmond, Va. The druggists of Denver attended his funeral in a body. Mr. Lyneman became a member of our Association at the Profile House, N. H., in 1892.

John M. Maisch was born at Hanau on the Main, Germany, on January 30th, 1831, where his father was a small merchant. Maisch attended first a private school, then the city free school, and the "Bürgerschule" (public school), which he finished when 12½ years old. His parents at this time obtained for him an apprenticeship with a jeweler, but as he was still of school age his parents were obliged to make application for a permit, which, however, was refused through the influence of Pastor Wörishoffer, principal of the school which he attended, and school inspector Roeder. Through the last named, Maisch was admitted into Class II. A. of the Realschule and instructed without charge.

In 1844 the Oberrealschule was opened and Maisch entered the same, devoting himself to the branches of Natural History. His teachers here were Theobald (Natural History), Bromeis (Chemistry), Pliedner (Physics and Mathematics), from whom, and also from others of his teachers, he received private instructions; so through Theobald he became acquainted with the microscope, and through Roeder with the dead languages. This latter had become necessary to permit Maisch to attend the University, as it was the desire of his mother that he prepare himself for the ministry. His love for natural history was, however, nourished through intercourse with young men of like inclinations, through working in laboratory and through botanical and mineralogical excursions, and resulted in the desire to devote himself entirely to the natural sciences. However, as his parents were not fixed financially so that he could wait for the slow advancement as a teacher in a University, he determined to study pharmacy. About this time Maisch grew very rapidly, leaving him rather weak, and this, combined with fatiguing bodily and mental exertions, caused a long sickness which compelled him for the time being to put aside his desire for study. He entered the service of the State, but as shortly after he joined the Turners of Hanau, he left this position, as he could not conscientiously work for the State during the day and against it at night, he taking an active part in the revolutionary meetings. In 1848 he entered a book-store as salesman, but as he took part, in 1849, with the Turners in the excursion into Baden, he was compelled to leave the country. He emigrated to America, landing in Baltimore, where for half a year he was working in a paper-box factory and also in a mattrass factory. From the year 1850 he was clerking in Baltimore, Washington, Philadelphia and New York, and in 1856 was working for a few months in a chemical laboratory. In 1859 Maisch was instructor in Prof. Parrish's School of Pharmacy for physicians, located over Prof. Parrish's store, at 8th and Arch streets, Philadelphia. In 1861 Maisch was called to the New York College of Pharmacy as Professor of Materia Medica and Pharmacy. As the lectures were only in the evening, he found employment in the laboratory of Dr. E. R. Squibb. In 1863 Maisch again changed his residence by going to Philadelphia to arrange and conduct the U. S. A. Laboratory, at 6th and Oxford streets, which had been planned by Surgeon-General Hammond. The report, presented toward the close of 1865, showed that in the 2½ years of its existence there was a saving of over three-quarters of a million dollars to the government (see condensed report, Proceedings A. P. A., 1866, p. 275).

After the close of the war, in 1866, Prof. Maisch opened a drug store at 1607 Ridge Avenue, Philadelphia, but conducted it only five years, when he was compelled to relinquish it, so as to devote more time to his literary pursuits, to the work of the Association, and to the Philadelphia College of Pharmacy.

In 1866 Prof. Maisch was called to the Chair of Pharmacy at the Philadelphia College of Pharmacy. In the following year, however, he made an exchange with Prof. Parrish, taking the Chair of Materia Medica, which he held until his death, or 26 years.

Prof. Maisch became a member of this Association in 1856; in 1860 he was elected as Reporter of the Progress of Pharmacy. In his report, presented in 1862, he introduced an arrangement similar to that of the Canstatt's Jahresberichte, and this has been retained in each subsequent report. In 1863 Prof. Maisch was elected First Vice-President; in 1864 he was elected Chairman of the Executive Committee, and in the year following he was the choice for Permanent Secretary, which position he held until the time of his death, or 28 years.

A work which was far reaching in its influence as regards the regulations pertaining to the pharmaceutical profession was started in 1867, when the Association offered to support the legislative bodies in working for a pharmacy law. To make this as far reaching as possible, Prof. Maisch began collecting the provisions and regulations of the different States which had any bearing on the pharmacists, and for this reason entered into correspondence with the Governors of the several States. The report was presented in

1868, and in the year following the Association adopted a draft of a pharmacy law which had been prepared by a Committee, and which was offered as a measure for properly regulating the pharmaceutical profession. While previous to this there was no pharmacy legislation in any of the States, since then, however, almost all have enacted laws with this end in view. Deceased served as Chairman of the Committee on Legislation for many years. He also labored unceasingly for many years on the following committees: Chairman of Committee on Papers and Queries, Chairman of the Committee on Drug Market, Committee on Ebert Prize, Committee on Ways and Means, Committee on Centennial Fund, Committee on Revision of Pharmacopœia, Corresponding Secretary, and last, but not the least, as a member of Council, in which body he will be missed as a prudent and able adviser for the Association's good.

His literary labors extended over a period of nearly forty years. His first article was published in the American Journal of Pharmacy, 1854, page 210, and was entitled "Adulterations of Drugs and Chemical Preparations." Since then the papers published under his name amounted to over five hundred, his last paper being published in the American Journal of Pharmacy, 1893, 125, and was "On the Fibers of Dioscorea Species." The first paper presented to the American Pharmaceutical Association, by referring to the proeeedings, was "On Effervescing Powders," and read at the afternoon session of September 10th, 1856, at Baltimore. His work in this direction was continued up to a short time prior to his death—the titles of the papers are as follows:

On the Detection of Adulterations of Volatile Oils, Bark of Cornus Florida, Tartaric Acid and Tartrates, Displacing Opium, Indigenous Plants, Oil of Bitter Almonds, Report on Volatile Oils, Essay on Solution of Tartaric Acid, Sulphuric Acid and Contaminations, Assay of French Brandy and Whisky, Medicinal Spirits, Quality of Sherry Wine, Active Principle of Rhus Toxicodendron, Specific Gravity of Medicinal Chloroform, Statistics U. S. A. Laboratory, Milky Juice of Lactuca Elongata, Lycopodium Clavata, Preparations from Lactuca Canadensis, Examination of Whisky and Brandy, Hydrobromic Acid, Narcotic Fluid Extracts, Verbal Report on Cannabis, Chinese Blistering Bugs, Sneezeweed, Assay of Preparations of Cantharides, Reactions of Chloral Hydrate, Time of Collecting Biennial Plants, Matico, Acid Phosphoric Dil, Purity of Commercial Spanish Saffron, Patented Chemicals, Oil of Wintergreen and Birch and Syrup of Iodide of Iron. In addition to the above, he also took an active part in the various discussions on all scientific papers which were presented and read to the Association. His remarks were full of sound judgment and were appreciated by all who listened to them, and will never be forgotten.

In 1859 Maisch reviewed the chemical part of the second edition of Parrish's Introduction to Pharmacy, and, in 1864, also the third edition.

The third edition of Griffith's "Universal Formulary" was prepared by Prof. Maisch in 1874. Twelve years previous to this, Maisch and his colleague, Ferdinand F. Mayer, had planned a commentary to the U. S. Pharmacopœia, and had begun the preliminary work when Mayer's death, in 1869, interrupted the same. The plan was later repeatedly modified and resulted in the publication of the National Dispensatory, in conjunction with Prof. Alfred Stillé, the first edition appearing in 1879. The want of a text-book on Materia Medica was felt by Prof. Maisch when he began to teach at the Philadelphia College of Pharmacy. In 1882 the Manual of Organic Materia Medica appeared. His work in conjunction with the Pharmacopœia began in 1860, when he supplied some articles to the commission, and from 1870 he had been a member of the Committee on Revision.

In 1854, at Baltimore, and 1855, in Washington, he received silver medals for an exhibition of samples of chemicals made by himself at the drug store, and intended as specimen cases for students.

Other recognitions of his work and worth, in the shape of honorary membership, began in 1867, when the Pharmaceutical Society of Brussels and, in 1868, the Pharmaceutical Society of St. Petersburg, elected him honorary member. Besides these, he held honorary or corresponding membership in quite a number of societies in all sections of the globe. The last recognition he received just shortly before his death, and consisted of the Hanbury Medal. It was commented on by many that he should receive, just at this time, an honor considered the highest in the pharmaceutical world, making it appear as the crowning point of a well spent and very useful life.

Prof. Maisch has seen active service in the American Pharmaceutical Association for 28 years, during all of which time he showed himself capable of grasping the situation at a glance, and although he permitted himself to be convinced if he found that he was wrong, yet if he was in the right he was firm until he carried his point. For all that though, he was a very unassuming man, and was always glad to give honor where honor was due. He had a dislike for any one who tried to deck himself with other feathers than those belonging to one's self properly; and in this he spared no one, even his most intimate friends had to experience it at times. His work in the Association, however, is so well known that it hardly needs commenting on.

Hugo William C. Martin, died at his home in Chicago, April 29th, 1894, aged 41 years. The deceased was born at Fond du Lac, Wis., March 8th, 1853. When at the age of 17 he entered the employ of Huber & Co., Druggists, with whom he remained three years. At the end of that time he removed to Chicago, where he was first employed by L. Schreiber, and subsequently by C. M. Weinberger. Mr. Martin improved his opportunities for acquiring a pharmaceutical education, and in 1875 was graduated by the Chicago College of Pharmacy. After his graduation he became a member of that College, in which capacity he proved himself so worthy that he was twice made a trustee. In 1892 he resigned his trusteeship to become director in the dispensing laboratory of the College, which position he held at the time of his death. A few years after his graduation, Mr. Martin purchased a pharmacy at the corner of State and Harrison streets, where he remained in business during his life. He was a ready leader of druggists, and fought well against the telephone monopoly, and later against the "cutters" of his city. He was a member of the Illinois Pharmaceutical Association, of which he served a term as Secretary. He was married May 4th, 1878, to Miss Lena A. Kirchner, who with two children survives him. The Faculty of the College met and adopted suitable resolutions on the death of their highly esteemed co-laborer, in whose taking off the pharmaceutical profession loses a sincere devotee and one whose works, had he been spared, would have shed lustre upon his calling. Deceased became a member of our Association in 1881, at the meeting held in Kansas City, Mo.

Theodore Metcalf, of Boston, died at his home April 26th, 1894. Deceased was born in Dedham, Mass., January 21st, 1812. He was from old colonial stock, his ancestors having come from England and settled in Dedham in 1634. At the age of fourteen he went to Hartford, Conn., where he served an apprenticeship of seven years to the drug business. He remained in that city three years longer, and in 1837 removed to Boston and engaged in business for himself at 39 Tremont Street, his establishment at that time surpassing anything of the kind in the city. While his success was not immediate, he gradually went to the front, afterwards well maintaining the lead which he had taken. In 1845, he gave up his business to Joseph Burnett, who had been his assistant for some years. Mr. Burnett kept up the reputation of the establishment until 1855, when he retired, being succeeded by Mr. Metcalf. Thomas Doliber was admitted to partnership about this time, and remained in the firm until 1883, when it was dissolved. Mr. Metcalf's next partner was F. A. Davidson, who is still connected with this house. In March, 1887, the 50th business anniversary of Mr. Metcalf was observed by a distinguished party of friends, who surrounded him at a commemorative banquet given in his honor, and spoke many warm words of cordial appreciation of the personal and business qualities of their venerable guest. Mr. Metcalf was influential in elevating the position of the pharmacist from the rank of a tradesman to that of a professional man. The natural result of his persistent and consistent endeavors was the establishment of an immense business. He had the intuitive perception of character which enabled him to surround himself with the best executive ability, and some years ago he associated with himself a number of his leading employees, those in charge of the different departments, and incorporated the Theodore Metcalf Company, of which he was Treasurer at the time of his death. He was for more than 30 years the Treasurer of the Channing Home, the first President of the Boston Druggists' Association, one of the promoters of the Massachusetts College of Pharmacy, a trustee of the City Hospital and of St. Elizabeth's Hospital. He was married in 1864, and leaves a widow, a son and four daughters. A special meeting of the Boston Druggists' Association was held on Saturday, April 28th, to take action upon Mr. Metcalf's death. A committee of three were appointed to draw up a tribute in memoriam. Deceased was a life member of our Association; his membership dates from 1857, at the meeting held in the city of Philadelphia.

James H. Munson, of Philadelphia, Pa., died quite suddenly of heart disease, May 21st, 1894, at his residence, 24th and Lombard streets. Deceased was born in Lancaster, Pa., in 1865, and at the time of his death was 29 years old. He graduated from the Philadelphia College of Pharmacy in 1886, and shortly thereafter went into business for himself at the corner of 24th and Lombard streets, where he was doing a successful business. He was a very energetic business man, and took great pride in dispensing pure drugs. He was a member of the Alumni Association of the Philadelphia College of Pharmacy and of the Pennsylvania Pharmaceutical Association. He was married, and leaves a widow and one child to mourn their loss. Mr. Munson became a member of our Association in 1889, at the meeting held in San Francisco, Cal.

Elisha H. Perkins, of Baltimore, died there after several years of gradually failing health, June 24th, 1888. Mr. Perkins was born in Chester County, Pa., July 9th, 1811. He removed to Baltimore in 1835, and entered the drug business, then being conducted by his brother, Dr. Joseph T. Perkins, at the southwest corner of Franklin and Green streets. He took up the study of medicine and graduated M. D. of the University of Maryland in 1839. He practiced medicine with his brother for several years until the state of his health admonished him to quit active practice. He then bought out the store northwest corner Baltimore and Green streets, and conducted the drug business actively and successfully until 1867, when he put the active management in other hands, retaining ownership. Mr. Perkins was a life member of our Association, and one of the oldest, having connected himself in membership in 1857 at the meeting held in the city of Philadelphia.

Edward C. Pfingst, of Louisville, Ky., died December 8th, 1893, aged 57 years. Mr. Pfingst was born in Hofgeisenau, Hessen Nassau, Germany, August 18th, 1836. He emigrated to Louisville in his 15th year, and shortly after began the study of pharmacy under Mr. Emil Scheffer. In 1859 he went into partnership with his brother, F. J. Pfingst, under the firm name of Pfingst Brothers, where he continued to the end. A few years ago his health failed, but he remained in active business until about a week before his death. He was one of the founders of the Louisville College of Pharmacy, and was one of the most active members, and also the President of the College for a term of years. He was of a kind and friendly disposition, and was endeared by all with whom he came in contact. Mr. Pfingst united himself in membership in our Association at the meeting held in Louisville, Ky., in 1874.

John C. Scribner, of Angels Camp, Cal., died May 22d, 1892, of dropsy of the heart, aged 71 years. Mr. Scribner was born in Tarrytown, N. Y. His father was a prominent physician, and also kept a drug store, where young John studied. In 1849 Mr. Scribner went to California, and worked in the gold mines for some time, with poor success. About 1850 or 1851 he bought a drug store from Henry Angels, at Angels Camp, and was doing very well, when he sustained a heavy loss by fire, which completely destroyed his whole stock and building. Later on he was burned out again. Meeting with these misfortunes limited his resources, which otherwise would have been considerable, as he was very attentive to business. In 1870 he purchased a drug store from Dr. Wm. Jones, in the same locality, and continued doing business there up to the time of his death. He was a very kind and generous man to the poor, contributing liberally to all charitable objects. Deceased became a member of our Association in 1889, at the meeting held in San Francisco, Cal.

George E. Shiels, a well-known druggist of New York City, died at his home, No. 53 East Twelfth Street, February 18th, 1894, of heart disease. He was born in Merida, Yucutan, Mexico, April 23d, 1826. He was a graduate of the New York College of Pharmacy, from which institution he received his diploma in 1851. In 1853 he established a store on the corner of Sixth Avenue and Twenty-third Street. He went successively to No. 896 Broadway, and to No. 821 Broadway. He was married; a widow and two sons survive him. Mr. Shiels was full of interesting reminiscences concerning people whose names are now famous, and with whom he had had business and social relations. Among them were General Scott the conqueror of Mexico, General Bolivar the South American Liberator, and others. He was an honorary member of the Scientific Society of Mexico, and corresponding member of the Medical Society of Yucatan. Mr. Shiels was highly regarded in New York. He was a man of exceeding modesty, and during his long residence he helped by advice and more substantial means a great many people, to many of whom his assistance was the means of business rehabilitation, as almost all the money amassed in his time was spent in relieving others, making advances on nothing other than unindorsed personal notes. Deceased attended but few of the meetings of our Association, yet he took extraordinary interest in the proceedings, as he was an enthusiastic pharmacist. He was a druggist of what may be termed the old school, and during the period of 40 years was not absent 40 days in all. His business methods were those of his first days, and a visit to his establishment was like turning back the pages of half a century. He was a familiar figure to frequenters of Broadway, and many inquiries were made by persons personally unacquainted when sickness necessitated his absence. Deceased became a member of our Association in 1860, at the meeting held in New York City.

J. W. Tomfohrde, of St. Louis, Mo., died November 5th, 1893, after an illness of three weeks, of pneumonia, which he contracted last year in Chicago, while visiting the World's Fair. Mr. Tomfohrde was born March 5th, 1851, and was therefore in his 43d year at the time of his death. Deceased became a member of our Association at the meeting held in Atlanta, Ga., in 1878.

Wm. L. Vennard, of New York City, died at his home in West Seventy-fourth street, on Saturday, October 28th, 1893, of heart disease, after having been an invalid for some six months. Mr. Vennard was born in Portsmonth, N. H., in September, 1843, his father having been collector of that port under President Pierce. Having completed his common school education, Mr. Vennard entered the drug store of J. H. Thacher, at Portsmouth, and when Mr. Thacher entered the army, Mr. Vennard was left in charge of the business, a position which he filled, as he had every position occupied by him, most acceptably. At the age of twenty he went to New York city to accept a clerical position with McKesson and Robbins, where he rapidly rose to the position of manager of the sundries department, and in 1867 was sent to Europe to select new lines of goods. The success of the department under his care was so marked that in 1885 he was admitted to partnership in the firm, continuing to death his especial attention to the fancy goods department. It was at the instance and under the direction of Mr. Vennard that the manufacture of perfumes was engaged in, and this branch of the business was conducted under the firm name of Vennard & Co. Mr. Vennard was a man of fine presence and address, of wide culture, and personally very popular. He took an active interest in the affairs of the New York College of Pharmacy, having been a trustee and a vice-president for several years. He was also a member of the Chamber of Commerce, a director of the Bowery Bank, and a member of the Committee of Manufacturing Perfumes, and of the Board of Trade and Transportation. Deceased became a member of our Association in 1866, at the meeting held in the city of Detroit, Mich.

In concluding this report, your Secretary desires to return thanks to all officers and members of the Association who rendered me valuable assistance when needed; the aid furnished certainly made the duties of the office comparatively light and pleasant. I would respectively request all members of the Association, when they hear of the demise of a fellow-member, to notify the undersigned as early as possible, and, if convenient, to forward date, so that he can prepare an obituary for the proceedings.

All of which is submitted, GEO. W. KENNEDY,
Secretary Committee on Membership.

The report of the Permanent Secretary having been called for, the following account of the finances of the various accounts in the care of the Secretary was presented by Prof. Remington, after which the Association adjourned at 6 o'clock p. m.

SUMMARY OF COSTS AND RECEIPTS FROM SALES OF NATIONAL FORMULARY, FROM JULY 1, 1893, TO JUNE 30, 1894.

I. EXPENSES.

Printing and binding 500 copies, cloth	$105 00
Extra for binding 30 copies interleaved	4 90
Circulars, expressage, postage, etc	38 68
Total expenses	$148 58

II. RECEIPTS.

From sales	$335 43

III. REMITTANCES.

To Treasurer, as per Treasurer's receipt	$335 43

IV. BILLS DUE THE ASSOCIATION FOR FORMULARIES.

From dealers	$40 30

V. BILLS DUE BY THE ASSOCIATION FOR FORMULARIES.

All bills rendered to date have been paid.

VI. COPIES DELIVERED GRATUITOUSLY.

To members of Revision Committe, 1 copy, interleaved, value at wholesale price	73
To members previously reported, Proceedings 1893, p. 34	741 04
Total number, 1422 copies, value at wholesale price	$741 77

VII. STOCK ON HAND.

Copies in cloth	137
Copies in sheep	9
Copies interleaved	5

RECAPITULATION OF TOTAL RECEIPTS AND EXPENSES.

Remittances to Treasurer to May 30, 1892 (Proc. 1892, p. 33)		$7,192 83
Remittances from May 30 to June 30, 1892 (Proc. 1892, p. 34)		37 04
Remittances from July 1, 1892, to June 30, 1893 (Proc. 1893, p. 34)		548 07
Remittances from July 1, 1893, to June 30, 1894 (see above)		335 43
Total cash receipts from National Formulary		$8,113 39
Cash payments to May 30, 1892 (Proc. 1892, p. 33)	$4,796 50	
Cash payments from July 1, 1893, to June 30, 1894	148 58	
Total cash payments for National Formulary		4,945 08
Total cash profit to June 30, 1894		$3,168 29

SALE OF PROCEEDINGS.

From July 1, 1893, to June 30, 1894, as per ledger account, pages 143–146	$100 50

This amount has been remitted to the Treasurer.

ACCOUNT OF BADGES AND BARS.

July 1, 1893.	Badges accountable to July 1, 1893		15	
Oct. 18th.	Received from S. A. D. Sheppard		50	
			65	
	Badges without bar sold from July 1, 1893, to June 30, 1894	$2 00	12	$24 00
	Bars sold from July 1, 1893, to June 30, 1894	50	28	14 00
	Total amount remitted to Treasurer for badges and bars			$38 00

Balance of badges remaining on hand June 30, 1894, 53.

RECAPITULATION OF RECEIPTS AND EXPENSES OF BADGES.

Receipts from badges to June 30, 1883 (see Proceedings 1893, p. 35)		$369 60
Receipts from June 30, 1893, to June 30, 1894		38 00
		$407 00
Cost of 200 badges	$350 00	
Cost of cut and electrotype	1 50	
Total expense of badges to November 16, 1893		351 50
Total profit for badges		$56 10

Cost of gold badges and bars, November 16, 1893, $103.50.

Philadelphia, Pa., June 30, 1894.

SECOND SESSION, TUESDAY MORNING, SEPTEMBER 4TH.

The Association was called to order by President Patch at 10 o'clock. The Minutes of the first session were read and approved.

The Secretary of the Council, Mr. Kennedy, presented the names of 47 persons proposed for membership approved by Council, which were directed to take the usual course. The Minutes of the Council were then read, and showed the transaction of the following business:

On motion of C. E. Dohme, it was agreed that all future meetings of the Association shall begin on Wednesday and close the following Tuesday; also that when the place of the next meeting shall be decided by the Association, the date of the meeting shall be left with the local Secretary and the Council to determine, notice to be given through the pharmaceutical journals.

The President asked for action on the minutes and explained that approval of them carried with it the adoption of the suggestions made.

Mr. Hallberg: Do I understand the Council has recommended that the meeting of this Association begin on Wednesday, and end on Tuesday?

The President: That is the recommendation.

Mr. Hallberg: I certainly would not approve of it. It is a very difficult thing for a great many to be present at the meeting of the Association for one week. This arrangement necessitates practically two weeks' business. I would like to hear what led the Council to approve of this time for the beginning of the Association.

The President: The Secretary of the Council heard all of the discussions, and he can probably give all the information you ask for.

Mr. Eliel: I think that Mr. Whitney can give that better than anybody else. If he will only make the explanation to the Association that was made to Council, I think there would be no objection.

Mr. Whitney: In replying I need only refer to the pleasant experience by the adoption of that course in our meeting in 1892, at the Profile House. It avoided the necessity of traveling two Sundays, and gave us a Sunday rest, including the officers of the Association, who are busy all the time from Monday until Saturday, or thereabouts, having no time for social intercourse, no time for meeting their friends, and spoiling in part the pleasure and rest which they hoped to get while attending the meeting of the Association. It obviates any necessity of traveling on Sunday in going, and it gives us a chance on Sunday to review the work we have done previously, and thereby correct any error which may have arisen in the haste. It gives a little chance for rest and recreation, and a chance to overcome any evil that may have been done by not exercising proper and fair consideration.

Coming down in the train from Boston this matter was discussed very thoroughly, not only among the men but among the ladies, and has been thoroughly discussed here, and every one seems to have approved it most heartily. Arguments against it were presented in the Council, but it was carried unanimously. I think if the gentlemen connected with the Association would dwell upon it for a moment, they would find it really takes no more time, except that it does away with traveling on Sunday and gives us one day intermission.

The President: You have heard the explanation of Mr. Whitney. Is it satisfactory?

Mr. Hallberg: Mr. Whitney gives us only a moment to think of it. My intellect is working so slowly this morning that I ought to have several minutes.

The President: While Mr. Hallberg is arranging the gray matter in his own mind, what shall we do with the records? (Laughter.)

Mr. Hallberg: I would like to say, Mr. Chairman, that the argument offered by Mr. Whitney has well-nigh convinced me. It never presented itself to me in that form before. I always thought that if we can travel Sundays we gain that much time, but of course that is not the case. As far as I can see, the explanation is satisfactory.

After further discussion by Messrs. Sayre, Bartley and Whitney, Mr. Bartley moved to amend the recommendation of Council in regard to change of time of meeting, so that the change shall apply only to the next meeting. This motion was carried.

Mr. Kennedy then stated that no objection had been presented to the Council against any of the names posted in the hall yesterday afternoon, and he therefore moved that the 96 gentlemen proposed be invited to become members of the Association. The motion was agreed to.

The President having called for the report of the Committee on Nominations, the Chairman, Mr. Gordon, presented the following report:

Your Nominating Committee respectfully submit the following names:

President—William Simpson, Raleigh, N. C.
First Vice-President—C. M. Ford, Denver, Col.
Second Vice-President—J. N. Hurty, Indianapolis.
Third Vice-President—Joseph E. Morrison, Montreal, Canada.
Treasurer—S. A. D. Sheppard, Boston.
Permanent Secretary—Charles Caspari, Jr., Baltimore.
Reporter on Progress of Pharmacy—Henry Kraemer, New York.
Members of Council—Wm. S. Thompson, Washington, D. C.; H. M. Whelpley, St. Louis, Mo.; S. P. Watson, Atlanta, Ga.

These are to fill the vacancies occurring this present year. There will be, on the election of Mr. Ford, of Denver, one more vacancy, and the Committee while in session nominated conditionally G. W. Voss, of Cleveland, to fill that vacancy. That will make four instead of three, and if Mr. Ford is elected it will become necessary to elect one in his place.

Upon motion of Mr. Alexander, the Secretary was directed to cast an affirmative ballot for the nominees, except the fourth member of the Council, who had been nominated conditionally.

Subsequently Mr. Alexander moved that an affirmative ballot be cast by the Secretary for G. W. Voss, of Cleveland, as a member of the Council, to fill the unexpired time of C. M. Ford, First Vice-President elect. This motion was agreed to.

No other important business having been presented, the President called for the report of the Committee on time and place of next meeting. Mr. C. E. Dohme, the Chairman, presented the following:

Your Committee, after a thorough discussion of the merits of the different places suggested, Denver, Col., Montreal, Can., and Hot Springs, Ark., have concluded to recommend Denver as the place of meeting in 1895, the time to be fixed by the Local Secretary in consultation with the Council of the Association.

The Committee at the same time feel constrained to state that Montreal, from which city we had a very hearty and pressing invitation, should be selected as the place of meeting of the Association either in 1896, or at an early date thereafter.

Respectfully submitted, CHAS. E. DOHME,
Chairman.

It was moved and seconded to amend the report of the Committee by substituting Montreal in place of Denver. The President having called for remarks the following discussion arose.

MR. DOHME: The subject was well considered whether we will visit Montreal or Denver, and was decided in favor of Denver, because Denver has been year after year inviting the Association to come there, and we thought it was due from this long continued invitation. At the same time the Committee thought that one of the first places of meeting after we had met in Denver should be Montreal, and this is given as the sentiment of the Committee.

MR. ELIEL: At the Chicago meeting your Committee, of which I was a member, reported in favor of Denver, Colorado, and it was the sentiment of the Association at that time, that after the expensive trip to Chicago and the expenses connected with it, we could not afford a trip to Denver at that time, but that we would meet at Denver this year. That was implied, and the way the vote was carried, and it was also the talk of the meeting. We have been urged to go to Denver the last 12 or 13 yeers, according to my recollection.

MR. FORD: I did not count on having anything to say at this time. I believe that it was understood at the meeting last night, that the report of the Committee as far as the members were concerned would stand, and there would be no objection made; it seemed to be the unanimous sentiment of the members of the Committee, and I do not think that I need to recite the superior advantages of Denver for a place of meeting. It has advantages as a convention City which are known to all. Its surroundings, about which I do not think it fair to boast—these things are there, and no other city can compete on this continent with the city of Denver. It offers unusual opportunities for the enjoyment of people with all kinds of tastes. If a man is inclined to sport he has the resources close by, and the mountains will afford opportunities to a man with rod and gun. The city itself, to those who stay in town, has everything that culture and refinement can suggest. It has hotels, in quality, in size, in elegance, not exceelled anywhere else on this continent. Every meeting of any importance, every convention of any magnitude, has been held at one time and another in the city of Denver, except the American Pharmaceutical Association. I think we have been extremely modest in our requests to have this meeting held there in the past. We have come here repeatedly, so much so that I said to the committee last night that it seemed like a chestnut, coming here and asking this Association to meet there. We honor this Association just as much by insisting on their coming there as they honor Denver by their attendance; because there is nothing to compare with the city in the advantages which it offers naturally, as far as the people are concerned there themselves, and as far as the disposition of the town, and it was shown I think in a very emphatic manner when the Association went through to the coast four or five years ago, when it seemed to be on the list that in the near future they would be given an opportunity to attend the meeting in the City of Denver. I think that they were sincere. We did not come out in 1890, because they were on the other side of the Missouri River; we came out in 1891 believing it our right, and because of the fact that as to the meeting of 1892 we were disappointed and the Association went to the White Mountains. I don't think anybody was sorry about going to the White Mountains—about as good a meeting as we have ever had, and I don't think we could go to a place where we could have a larger meeting. At the World's Fair, we could not expect it then, and did not ask for it, because everything was going to the World's Fair City; but coming now to 1894, and having missed it this year, I think we have rights nobody can contend against for the meeting next year. The hospitality of our people, the desire to entertain the Association was manifest at that time and I hope no great time will be wasted here on the selection of the time and place. So far as I have made a canvass among the attendants of this meeting, it is the universal desire to come to Denver. If it should happen that a majority present in this hall would decide otherwise, I don't think then it would be a fair reflection of the wishes of the members of this Association. Now about the railroad fare—something has been said about the distance, and it is a misfortune that you may have to look at it in that way. We are citizens of so large a country. Our country extends from the Atlantic to the Pacific. Again divide our Association as its membership extended over that territory in 42 years. This Association in all its existence has gone only once on the other side of the Missouri River, three times beyond the Mississippi River, and one of these times to the Missouri—to come now and ask it a second time to go beyond the Missouri River, I don't think is asking very much, and I hope the Association will give us the meeting.

Mr. Sheppard: As this subject has been taken up, I want to say a word upon it. It has been my fortune to be on this Committee, and consequently I feel that I had a little experience, and have thought of the subject, and I thought I would bring before this Association the facts. The question is what shall be for the good of the Association, not for our individual preferences. That has been the idea, that has been adopted, and has been worked out this year. One main thought always is what good can the Association gain as well as what can the members learn. We have never met in Canada, and but once in the City of Toronto. Toronto is very near the American line. We have never met in any part of Canada which represents the Canadians as Montreal or Quebec does, and there is certainly a very broad field for work in Canada. Our Association has comparatively few members there, and the time must come, and it ought to come in the very near future, when we can do work in Canada, which can be done only by meeting in Canada, and bringing into personal contact with the work of the Association the people of Canada. That is the side of Montreal from the Association's standpoint, as to missionary work for the Association to do; but look at the other side. No city in Canada, except Montreal, I think, has sent us a direct official invitation as Denver has. This is the first time we have received an official invitation from Montreal and from Denver, Denver on the other hand has never had a meeting. Of course, the territory around Denver does not compare to the territory around Montreal, representing as it does the whole of Canada; but to offset this there is a very large territory there, and it represents the centre of an immense district. Denver has been honestly and earnestly persistent in her efforts here for many years, and it would seem that that large section of territory, although it is sparsely settled, and that is recognized—this honest effort which has been made for so many years, knocking at the doors of the Association ought to be recognized; and while recognizing that, we ought also to recognize very fully the claims that come from the Northern part of the country—the claim that they have on the Association, and if we vote to go to Denver as a body, I feel that the second choice will be Montreal as soon as possible.

Mr. Hallberg: Mr. Chairman, I think our worthy friend Eliel slightly erred in stating that the Committee on Place reported last year in favor of Denver. It reported in favor of Hot Springs, Arkansas, the only Hot Springs in the United States. (Laughter.) Now, inasmuch, Mr. Chairman, as you have practically decided on a meeting for next year, and practically decided for a meeting the year after that, why not also decide upon the place of meeting three years hence, and let it be at the Hot Springs, Arkansas? To those of you who imagine that the State of Arkansas represents anything which is not properly within the confines of civilization, I tell you you are very much mistaken. The City of Hot Springs has got more drug stores than it has saloons. (Laughter).

By that I mean, it has a large number of drug stores, and where you see pharmacy conducted as it ought to be, and where you find them putting up sometimes from fifty to one hundred prescriptions every day in the week, and mixtures that would gladden the hearts of the druggists, mixtures that do not bring less than a dollar and a half. We have a number of practical pharmacists in Hot Springs, although they are nearly all in one block in one street. I make a point here. I say they have there the finest hotels in the United States, at Hot Springs, Arkansas; and I hope that this Association will not ignore the claims of Hot Springs, and that at the very earliest opportunity it will visit it. Of course, I am in favor of Denver. I remember in 1889 how royally we were entertained—you druggists gave us an excursion up to Clear Creek Canyon, up to Silver Plume, and they threw in a wreck on the way. I hope next year we will go to Denver.

Mr. J. E. Morrison: I will say while Montreal has only invited the Association for the first time, that last year there was practically a non-official invitation extended, and that as this Association has not been north of the line since 1877—seventeen years ago, it is almost due to the pharmacists that we should make an attempt to go to Montreal. To the majority of the membership of this Association it would be easier to reach Montreal, and cost less money than going to Denver; but the principal object for which these invitations are worked up, was as Mr. Sheppard stated, a missionary one. I believe firmly that if this Association holds its convention in Montreal next year, it will mean a large increase in membership. There are a great number of first-class pharmacists over there. We have had stringent laws in force, especially in the province of Quebec, for about twenty years, and they do not take the necessary amount of interest in this Association that they should. I think that this Association should be represented not only in the United States, but in Canada, and take in a membership of both countries. Practically, that line of forty-five degrees is merely an imaginary line, dividing one people into two nations. All our interests are not political interests, as we are one race, and one people. We should stick together, and I think that we should attempt to increase the membership from Canada. I have no doubt whatever that that can be done. As regards the advantages offered by Montreal, Brother Ford has stated the facts. Denver is naturally a western city, west of the Mississippi, and you must not count very much on that. I might state also that we have very many natural advantages to fishermen. We have streams full of brook trout, we have a wilderness full of lake trout, and we have everything that can gladden the heart of the sportsman with rod and gun. It is easy to go to Montreal, while in going to Denver it would be a very great distance, a journey of three days, and you will be pretty tired and stiff by the time you cross the hot plains of Illinois and Iowa, and reach Denver. (Laughter.) You must actually make a trip across those prairies, where the heat is intense. (Laughter.)

Mr. Alexander: How about the same prairies that we will have to cross while going to Montreal?

Mr. Morrison: That is, if of course you must cross them; but the majority being in the East would not require to cross those prairies, consequently, it would be very much to the advantage of the majority not to go across them. The motto is, "The greatest good to the greatest number." But I will leave it to the sense of the meeting, and although Brother Good and Mr. Ford are both enthusiastic and are very hopeful, I have not given up the idea yet but we will have the convention next year in Montreal.

The President: A division is called for on the amendment, which is, that the name of the City of Montreal shall be substituted for that of Denver.

Mr. Eliel: Before that is put to vote, I would like to state one thing; two years ago we met within two hours ride of Montreal, in the White Mountains.

The question being on the division, the vote was ayes 36 (for Montreal), nays 49 (for Denver). (Tremendous applause.)

THE PRESIDENT: The motion before us now is, the adoption of the report of the Committee as presented.

MR. MORRISON: I would move that this selection be made unanimous.

This motion was seconded.

THE PRESIDENT: The motion before the house is, that the report of the Committee, which fixes upon Denver as the place of the next meeting, be unanimously adopted.

MR. WHELPLEY: I desire to speak to that motion. I attend the meetings of the American Pharmaceutical Association wherever they are, and I am present first, last, and all the time; nevertheless, I always feel an interest in knowing where the next meeting of the Association will be, and in voting for Denver unanimously as we shall, and freely as I believe we will, and correctly as I am sure we shall, I want to have it done with the understanding that that vote for Denver is for 1895, and at Denver we will decide where we shall go in 1896. I believe the principle is wrong of our deciding one year where we shall go two or three years after, because the people who attend the meetings are the ones who should have a voice in selecting the place of meeting for the next year. I have received numerous letters from those who thought of attending the meeting next year; they have said, let us have the meeting West next year, if you go to Asheville this year. The Association always meets too far East for them to attend. When we meet in Denver, we will give those who make this cry an opportunity of showing whether they will attend this meeting when it is held near their home. For that reason I say they should have a voice in deciding the place for the next meeting, and we should not on this occasion compromise them by any agreement that it is understood tacitly that we meet in 1896 in Montreal, or in any other place in 1896. We had a tacit understanding in Chicago that we will meet in Asheville in 1894, in Hot Springs in 1895, and here we are deciding to go in 1895 where it seems to be best in the judgment of these people. Now let us all follow that plan in Denver for 1895, and we will think it over before we vote for 1896.

The question being on the motion, it was agreed to.

MR. HALLBERG: I move a re-consideration of this question; I voted for it.

MR. THOMPSON: I move to lay that motion on the table.

THE PRESIDENT: I have not heard a second to Mr. Hallberg's motion. There is no question before the House. We have not unanimously adopted the report of the Committee; there was one dissenting vote.

MR. HALLBERG: I made this motion for reconsideration, because in my experience, several times the place of meeting has been adopted, and then at the last moment it has been changed for some other place. I wish to avoid that; I don't think it is right.

MR. WHELPLEY: I will second the motion to reconsider.

The motion was then stated by the Chair.

MR. THOMPSON: I renew my motion to lay the motion to reconsider on the table.

MR. WHELPLEY: Now, every one who desires to go to Denver should vote to lay this motion on the table.

The question being on Mr. Thompson's motion, it was agreed to.

The Treasurer then read his annual report as follows:

REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JULY 1, 1893, TO JULY 1, 1894.

RECEIPTS.*

Cash on hand, July 1, 1893		$5,191 14
Received from the sale of 8 Certificates @ $5.00		40 00
Received from the sale of 11 Certificates @ $7.50		82 50
Received from the sale of Proceedings		86 70
Received from the sale of Badges		38 00
Received for Interest on Deposit in New England Trust Company, Boston		134 10
Received for Interest on Money Invested in Bonds, (General Fund)		150 00
Received from Centennial Fund		50 00
Received for Annual Fees, 1890	$5 00	
Received for Annual Fees, 1891	55 00	
Received for Annual Fees, 1892	120 00	
Received for Annual Fees, 1893	3,995 00	
Received for Annual Fees, 1894	1,900 00	
		6,075 00
Received for Life Membership Fees, viz.:		
Henry M. Whitney	$10 00	
Henry M. Pettit	10 00	
John F. Llewellyn	28 00	
		48 00
Received from sale of National Formulary		289 54
		$12,184 98

DISBURSEMENTS.

1893.				
July	22.	Check 353. Palmer, Winall & Co., Section on Commercial Interests		$1 75
	22.	Check 354. Chicago Daily Call, Section on Legislation and Education		4 00
	22.	Check 355. S. A. D. Sheppard, Second One-half Year's Salary as Treasurer, 1892–1893		375 00
	22.	Check 356. George W. Kennedy, Second One-half Year's Salary as Secretary of Council	$25 00	
		Second One-half Year's Salary as Secretary of Committee on Membership, 1892 to 1893	75 00	
				100 00
	22.	Check 357. John M. Maisch, Second One-half Year's Salary as Permanent Secretary, 1892 to 1893		375 00
	26.	Check 358. Wickersham Printing Company, Insurance for Two Years	$10 00	
		Proceedings	10 65	
		National Formulary	3 63	
				24 28

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* An alphabetical list of names of members from whom money has been received from July 1, 1893, to July 1, 1894, will be found following the minutes of the tenth session.

August	29.	Check 359.	U. Holyer, Printing and Stationery		$4 85
	29.	Check 360.	S. A. D. Sheppard, Sundry Expenses		41 35
	29.	Check 361.	John Dickson & Company, Proceedings		16 25
	29.	Check 362.	H. R. Grassmann, Printing and Stationery		18 50
	29.	Check 363.	John M. Maisch, International Pharmaceutical Congress		78 75
	29.	Check 364.	John M. Maisch, National Formulary.	$8 81	
			Sundry Expenses	26 24	
					35 05
	29.	Check 365.	Tarrant & Company, Committee on Transportation		37 04
	29.	Check 366.	John Dickson & Company, Proceedings		6 75
	31.	Check 367.	H. M. Whelpley, Committee on Membership, 1892 to 1893		17 00
	31.	Check 368.	L. C. Hogan, Section on Legislation and Education		5 00
	31.	Check 369.	Robert G. Eccles, Section on Legislation and Education		11 05
	31.	Check 370.	W. E. Carson, Services as Stenographer		25 00
October	19.	Check 371.	W. E. Carson, Services as Stenographer		50 00
	19.	Check 372.	Standard Publishing Company, Committee on Membership, Printing and Stationery		4 00
	19.	Check 373.	Charles T. P. Fennel, Section on Scientific Papers		24 07
	19.	Check 374.	H. M. Whelpley, Expenses Attending Meeting	$48 00	
			Salary	50 00	
					98 00
	19.	Check 375.	C. A. Twitchell & Co., Badges		8 00
	19.	Check 376.	Willard H. Torbert, Section on Commercial Interests		9 08
	19.	Check 377.	J. B. Lippincott Company, International Pharmaceutical Congress		229 20
	19.	Check 378.	William Simon, Section on Legislation and Education		13 00
	21.	Check 379.	Joseph P. Remington, International Pharmaceutical Congress		7 57
	21.	Check 380.	S. A. D. Sheppard, Traveling Expenses		86 35
	30.	Check 381.	W. E. Carson, International Pharmaceutical Congress		75 00
November	4.	Check 382.	Edgar L. Patch, Sundry Expenses		26 96
	8.	Check 383.	Henry Kraemer, Second One-half Year's Salary, 1892 to 1893		375 00
	11.	Check 384.	New York Engraving & Printing Company, Proceedings		27 90
	15.	Check 385.	M. R. Warren, Printing and Stationery		27 25
	17.	Check 386.	Oscar Oldberg, International Pharmaceutical Congress		44 00
	17.	Check 387.	J. C. Benedict, International Pharmaceutical Congress		9 00
	17.	Check 388.	Thayer & Jackson Stationery Company, International Pharmaceutical Congress		11 15

November	18.	Check 389.	St. Louis Engraving Company, Badges		$103 50
	18.	Check 390.	Edward Kremers, Centennial Fund		50 00
	22.	Check 391.	Wickersham Printing Company, National Formulary		108 60
	23.	Check 392.	W. Bodemann, Section on Commercial Interests		24 50
	23.	Check 393.	Willard H. Torbert, Section on Commercial Interests		34 00
	29.	Check 394.	W. E. Carson, Services as Stenographer		50 00
December	5.	Check 395.	New York Engraving & Printing Company, Proceedings		12 00
	11.	Check 396.	Wickersham Printing Company, Proceedings	$5 13	
			National Formulary	7 67	
					12 80
	20.	Check 397.	John Collins, Proceedings		12 00
	27.	Check 398.	Harry Sharp, Committee on Transportation		26 00
1894.					
January	10.	Check 399.	Charles E. Dohme, Sundry Expenses		4 01
	10.	Check 400.	S. A. D. Sheppard, Expense of Collecting Drafts		43 20
	15.	Check 401.	F. W. Barry, Beale & Co., Printing and Stationery		6 00
	17.	Check 402.	New York Engraving & Printing Company, Proceedings		14 20
	20.	Check 403.	Joseph P. Remington, Sundry Expenses		36 33
February	2.	Check 404.	G. A. Trausne, Engrossing Resolutions, (J. M. Maisch)		18 25
	5.	Check 405.	Wickersham Printing Company, Proceedings		648 06
	5.	Check 406.	Wickersham Printing Company, Proceedings		411 65
	7.	Check 407.	American Bank Note Company, Certificates		75 00
	7.	Check 408.	New York Engraving & Printing Company, Proceedings		5 18
	12.	Check 409.	Wickersham Printing Company, Proceedings		7 20
	16.	Check 410.	Evening Chronicle, Committee on Membership.		132 50
March	1.	Check 411.	Not used.		
	1.	Check 412.	S. A. D. Sheppard, First One-half Year's Salary as Treasurer, 1893 to 1894		375 00
	1.	Check 413.	Wickersham Printing Company, Proceedings		6 25
	1.	Check 414.	Standard Publishing Company, Committee on Membership		49 80
	1.	Check 415.	Not used.		
	8.	Check 416.	Henry Kraemer, First One-half Year's Salary as Reporter on Progress of Pharmacy, 1893 to 1894		375 00
	29.	Check 417.	American Surety Company, Premium on Treasurer's Bond		25 00
	31.	Check 418.	Estate of John M. Maisch, Balance of Salary to date of his death, October 7, 1893		110 42
	31.	Check 419.	Joseph P. Remington, First One-half Year's Salary as Permanent Secretary, *pro tem.* (from Oct. 7, 1893)		264 58
	31.	Check 420.	Wickersham Printing Company, National Formulary		8 37

April	3.	Check 421. M. R. Warren, Printing and Stationery		$70 20
	5.	Check 422. J. B. Lippincott Company, Proceedings		2 00
	9.	Check 423. George W. Kennedy, First One-half Year's Salary as Secretary of Council, 1893 to 1894.	$25 00	
		First One-half Year's Salary as Secretary of Committee on Membership, 1893 to 1894	75 00	
				100 00
	9.	Check 424. George W. Kennedy, Committee on Membership		26 17
	26.	Check 425. Elwert & Weniger, Journals for Reporter on Progress of Pharmacy		25 44
May	5.	Check 426. The F. Gutekunst Company, Proceedings		51 00
	10.	Check 427. F. W. Barry, Beale & Co., Printing and Stationery		15 25
	10.	Check 428. Evening Chronicle, Committee on Membership.		10 60
June	5.	Check 429. Wickersham Printing Company, Proceedings		1919 46
	5.	Check 430. Wickersham Printing Company, Proceedings,		32 05
	5.	Check 431. Wickersham Printing Company, Proceedings		397 77
	5.	Check 432. Wickersham Printing Company, National Formulary		6 27
	5.	Check 433. Andrew P. Preston, Printing and Stationery		1 10
	7.	Check 434. Evening Chronicle, Committee on Membership.		5 35
	23.	Check 435. S. A. D. Sheppard & Co., Sundry Expenses		31 10
1893.				
December	12.	Life Membership Fund		10 00
1894.				
January	8.	Life Membership Fund		10 00
May	14.	Life Membership Fund		28 00
		Total		$8,093 31

SUMMARY OF DISBURSEMENTS.

July 1st, 1893, to July 1st, 1894.

Proceedings	$3585 50
Stenographer	125 00
Journals for Reporter on Progress of Pharmacy	25 44
Salaries, second half of the year 1892 to 1893	1275 00
Salaries, first half of the year 1893 to 1894	1225 00
Premium on Treasurer's Bond	25 00
Traveling Expenses	134 35
Section on Scientific Papers	24 07
Section on Legislation and Education	33 05
Section on Commercial Interests	69 33
Committee on Transportation	63 04
Committee on Membership, 1892–93	17 00
Committee on Membership, 1893–94	228 42
International Pharmaceutical Congress	454 67
Printing and Stationery	161 40
Insurance	10 00
Miscellaneous Expenses	209 19
Badges	111 50
Blank Certificates	75 00
Total amount paid out for current expenses	$7851 96

Life Membership Fund	$48 00
Centennial Fund	50 00
National Formulary	143 35
Total amount of Disbursements	$8093 31
Cash on hand July 1, 1894	4091 67
	$12184 98

Of the cash in the Treasury the sum of $735.73 belongs to the account of the Committee on Arrangements, as per following statement:

ACCOUNT OF COMMITTEE ON ARRANGEMENTS.

1893.		
July 1.	Cash on hand'	$721 31
1894.		
July 1.	Interest to date	14 42
		$735 73

PROSPECTIVE ASSETS.

Not counting what is due from members whose names will probably be dropped from the roll at the next annual meeting, and also those members whose residence is unknown, there is now outstanding on the books of the Association:

Annual Dues for 1893	$590 00
Annual Dues for 1894	4765 00
	$5355 00

Respectfully submitted. S. A. D. SHEPPARD.
Treasurer.

MR. EBERT: How many new members did you get in?

MR. KENNEDY: I cannot tell how many are going to complete their membership. I can tell you this much, that there are about one hundred who have paid the $5, and from twenty-four to twenty-five more to complete their membership of the one hundred and forty-two so far recommended. That will make about six hundred and some odd dollars.

MR. EBERT: I want to call attention to this fact, that it costs us about 50 per cent. of what we get to obtain a member, and we give them a volume of proceedings which costs us close on to what they pay for membership, and it is about time that this expensive way of bringing in members was stopped. That is one of the financial leaks, and it had better be stopped as soon as possible for the sake of the Association.

MR. KENNEDY: And there was some little expense in regard to issuing the circular over the country; but it must be remembered that there are a good many druggists who know nothing at all about the existence of the Association, neither do they know anything of its workings, nor do they know anything of its advantages, and if we do not realize one cent at this time we may in the future.

THE PRESIDENT: You have heard the reading of the report of the Treasurer. What is your pleasure in relation to it?

MR. WHELPLEY: I move that it be approved.

MR. EBERT: I would like to ask a question as to what was the expense of printing the papers prior to the meeting?

MR. SAYRE: As I understand it, it does not cost the Association anything, and it is a saving in some respects, as the printer tells me that he holds the type for the report.

MR. EBERT: What printer?

MR. SAYRE: The printer for the Association at Lancaster.

MR. EBERT: If there is no expense, it is all right.

MR. SHEPPARD: It is included in the sum total of the costs of the proceedings, and the expense of the Scientific Section for the past year was twenty-four dollars.

MR. ELIEL: I have listened to this report very carefully, hoping that I would find a credit item there, which I am sorry to say I do not find. It is possible it has not come in, or that it is intended it should not come in. I notice that the United States Dispensary has the National Formulary incorporated in it. Am I to understand that it is gratis, or do they intend to pay this Association a sum commensurate at least for part of the expense entailed in getting up this work! The National Formulary, I understand it, is the property of the American Pharmaceutical Association, and if they have not paid for it, I should like to know why it is that this work has been incorporated in that book.

THE PRESIDENT: I am unable to inform you, but perhaps Secretary Remington can give you the information called for.

PROF. REMINGTON: I believe the National Formulary was intended to be used by every druggist and every doctor in the United States. So far as I know, there is no copyright of the National Formulary which gives the American Pharmaceutical Association the exclusive right to all these formularies; besides that, the formularies of the National Formulary have been compounded by druggists all over the United States freely, and the intention of that book is that it shall go into every drug store in the country, and every doctor shall have the use of it; and in mentioning the matter before it was put into the United States Dispensatory this fact was called attention to, and I was told to go ahead, and that I would receive the thanks of the druggists of the country and of the members of the American Pharmaceutical Association for putting this into the United States Dispensatory.

MR. ELIEL: Mr. President, I merely brought this matter up because I heard some comments on this thing; I think it only fair that this matter be fully and thoroughly explained. I am perfectly satisfied with Prof. Remington's information. I think that an explanation was due, and I only brought it up for that purpose.

PROF. REMINGTON: I wish to say further that if the American Pharmaceutical Association desire any money consideration from the publishers of the United States Dispensatory I will answer for them that they will be very glad to give it to them.

MR. HALLBERG: I think the reason why the physicians do not utilize the National Formulary to the extent that they might, is due to the fact that it is not presented to them for use as it would be if incorporated in the United States Dispensatories or other Dispensatories, and I may also add other medical works, which would help us very much; and if this was done the National Formulary would become a very much more popular work and much more effective.

THE PRESIDENT! The matter before the Association is the reception and approval of the treasurer's report.

The question being on the acceptance and adoption of the report, it was agreed to.

THE PRESIDENT: Before calling for further reports, I would like to make the following announcement: There will be a meeting of Council directly after the adjournment of this meeting, and you will also bear in mind that in adopting the report of your Committee on the Time and Place of the Next Meeting you have fixed upon the place of the next meeting, and that the time should be left to the Council and the Local Secretary, consequently you will look for that announcement in the journals. The question has been raised whether the report of the Committee carried anything more with it than fixing the place of the meeting. That is all that it carries with it, for in adopting the minutes of Council you have left the matter of the time with the Local Secretary, who will announce it in the various pharmaceutical journals.

MR. GOOD: I desire to state that the special object in calling a meeting of the Council immediately after adjournment of this session is to give an opportunity for the new members elected to the Council to become acquainted with the older members, and to cooperate with them from this day in the business of the Council, so that all the newly-elected members will please remain and unite with us in that session; the old members of Council and the newly-elected members of Council, and the Vice Presidents and President, and all officers, all those who constitute the new Council, are cordially invited, and in fact we insist on their being present at this meeting.

The report on the Progress of Pharmacy was then called for.

MR. KRAEMER: The report on the Progress of Pharmacy is not quite completed, but will be ready, and it is to be hoped in the hands of the Permanent Secretary by the 1st of October. It will be similar in arrangement and in contents to that presented and published last year. It will differ, however, in two particulars: (1) Some of the references in theoretical, analytical and organic chemistry, with some botanical subjects, will be omitted, and the journals cited in the preface, in which this has been most noticeably done. At the same time it has been my endeavor to give more extended abstracts of material inserted. (2) In the department of bibliography a synoptical review, or at least an abstract, will be given in some cases of the books that are included therein. I again commend to your consideration the suggestions contained in my previous report (Proc. 1893, 51).

THE PRESIDENT: You have heard the report of your Reporter on the Progress of Pharmacy: what is your pleasure in relation to it?

MR. HALLBERG: I move that it be adopted.

Seconded.

MR. EBERT: Now in what I intend to say, gentlemen, I do not wish to convey the idea that there is any personality in anything in relation to this report. At our last meeting your Reporter asked for criticism of his report, and he asked for some discussion as to the arrangement of it, and said he would like to have a criticism. Since coming to this meeting I have conferred with him, and have notified him that I intended to criticise his report. I do it in no personal way, because I have the highest esteem for the gentleman who has compiled the last year's report, but I want to call the attention of the Association to certain things in the report which I consider unnecessary at least; I mean in regard to the expense, unless it is to be changed in the subsequent report. I do this because I think it is essential. The gentleman after speaking to me at the time of the last report, and after my mentioning it to him, felt that he would like to make the changes according to my suggestion, but I did not wish to dictate to the Reporter on the Progress of Pharmacy what his report should be; it is not to be Ebert's report, it is to be the report of the Association, and they are to decide, not Mr. Ebert. For that reason I bring up this matter in regard to last year's report, and I have in my hand the report, so that I will not make any error in my statements, and I would like to refresh my memory, by looking at the report, with the report itself. I have no memorandum, so if I make any errors it will be because the matter has slipped from my memory. I went over this report carefully, gentlemen, and find that the Reporter in his last report makes a great many citations—that is, instead of making an abstract of it he makes a simple citation where he obtains such and such information, without giving us any clue. What practical use could this possibly be for me? Simply the heading of the article, and then on twenty-two consecutive pages not less than one hundred such indexes or citations. I will read one of them as an illustration, so that you may understand it. Take the very first one as an illustration: "Apparatus and Manipulations. Absorption and Washing Apparatus.—C. Mann, Zeitschr. f. anal. Chem., 1893, 186."

Now I want to know what information that is to me? It may possibly be information if I desired it, and wanted to look it up—the matter of the Washing Apparatus. But the membership of this Association consists largely of working members, Pharmacists who are simply Pharmacists, not teachers in Colleges of Pharmacy, or editors of journals who have access to these authorities. It is the great body of druggists, it is the workers, to whom this report should be made valuable. It should be a work that can be referred to where in a few words a pharmacist would find exactly what was necessary. If it is necessary afterwards to go into details and go over the ground carefully, why then I can go to the expense of getting these journals so that it will be of more advantage to me. Now it strikes me that so many of these citations as that are of no practical value to the druggists who comprise the majority of the membership of this Association. No doubt it is valuable to teachers and manufacturers, but to us who really pay for the issuing of this report surely we ought to be the ones benefitted, aud if it does us no good we might just as well do without it. This is one objection you will find in this report—not like previous reports. You will find that citations go through the report.

The next thing I find fault with is devoting some twenty pages to the making of a statement in reference to State Pharmaceutical Societies, that they meet at such and such a place, and that they have contributed such and such papers, giving simply the number of papers of each. That really is of no value, because we would have to get the proceedings of these societies to be of value to individual members. It goes on after that and gives us, under a heading, a large number of editorials relating to cutting prices, and the relation between the physician and pharmacist, that also comprises twenty pages and is of no value whatever. The different pharmaceutical journals might get them and read them, and it might do them good—they are simply individuals anyhow, and if we desired to make that reference we would have to look up the journals to see what had been written on that subject. There are some others that I don't recollect. The next objection I make is to the obituary notices. The reporter has gone to work and has singled out in that report a number of eminent pharmacists in foreign countries and in this country. Now I do not consider that report is necessary at all. Such a notice is not necessary in his report, and the space should be taken up by the report itself, or at least the Secretary should give these obituary notices. It seems to me unfair that any one man should be singled out and the others ignored, and, therefore, I consider that out of place. Another thing I called his attention to and in which I thought he seemed to meet me, was in the use of dashes for the repetition of the same subject. For instance, in many pages we have a simple dash in the place of the name of the subject, and to find out what it is we have to look on the preceding page. The use of the dash costs us just as much money as if the printer had set it up solid. They charge for so many thousand ems, and they have to be paid. It would be no harder work—it is the same work on the part of the printer, and I am sure he will accede to that. In speaking to him of this matter he said, I agree with you and I think these changes will be made. I thought it would be best to bring this matter up before the Association, because, as I said, I don't want it to be the report of Mr. Ebert, but the report of the Association. I want to say furthermore, that this report otherwise has been one of the most valuable publications that has ever been issued in the English language, especially in this country, and every pharmacist will find it of great value for reference, and so will be the future, provided the Reporter gives us in a few words the gist of something which is of practical use for the working pharmacist.

MR. SAYRE: I would like to emphasize the last words of Mr. Ebert, and I should like, not taking up the time of the Association too much, to say one word with regard to what seems to be an error in his remarks. It seems to me that the spirit of this Association is not a selfish one. If we endeavor to issue our report to aid the editor and the teacher, those who are entirely outside of the Association, we are, it is true, acting upon unselfish principles. I think it is the motive of the Association to be unselfish, and if we do not look too close to our noses, we should see that we are selfish in one respect. I believe that we are helping ourselves and we are looking to our immediate welfare when we assist the professor or the editor, or whoever comes into the field of pharmaceutical work. As to the references there made, there is but a line, it is true, and it gives an opportunity for the access of the journals referred to. Furthermore, he does not care—he does not even look over those pages, but there are a great number of persons, manufacturers, teachers and editors who do, and they use this for their purposes. Now I claim, Mr. Chairman, that all of this work does help the pharmacist, and it seems to me, if we are working unselfishly for an ideal, that is one idea as to these things, that when we do these things we are doing it because it is worth it. I have looked over and studied the report very carefully, as has also our friend, and I want to say here that I see throughout that report the very same spirit that we are all working for, an unselfish spirit to help others on their way; and I want to say that we should never lose sight of that.

MR. KRAEMER: As the author of that report, of course, I must make some explanation to you. In the first place, I would like to call attention to the fact that my experience has brought me into contact with men of all kinds. I am fitting myself for scientific work—a teacher's career. I was educated in a drug store, consequently my training has been various. Before beginning on this report I gave four months' thought as to how I was going to do it. I saw, of course, what was being done; looked over the pharmaceutical papers; looked over the Year Books; looked over the Proceedings of previous years to catch the results, and I would just like to call your attention to the real object of the work: it is an object lesson to you. The fact has been brought to your attention before this body and in the reviews, and the transactions of the State Associations. I think that you will admit my work in the construction of the work has been most unselfish, when I say to you that I received but two Proceedings from State Associations. I spent three days in Philadelphia looking over the Association Proceedings which were there, and spent nearly all of the rest of the time, before the final report was completed, in reviewing other books and journals. I received some pharmaceutical journals where there was reference made to proceedings and mention of papers read. I felt there was something even in that.

I would like to call your attention to the report right here, it is so insignificant, takes up so small a space—I will just read one or two extracts from it: "The Best Method of Preventing the Growth of Fungi in Alkaloidal Solutions—J. A. Flexner has found boric acid to be the best." I simply mention that as an illustration.

I will also refer to the paper on beeswax, page 725 of the Proceedings. That man has spent a great deal of time on that paper. How many of us turn to these works? This paper is well prepared. This man has done his work well. He has done his very best, and it indicates to you the nature of the work done by the members of State Associations. Gentlemen, this is a National Association, and my idea of the thing is, you must have the interests of these people in this work, and by having the people interested, feeling that you recognize their work, they will in time become contributors to the Proceedings, and in many cases their work will be very valuable and worthy of record.

You will notice that where there are subjects relating to pharmacy, I call attention to the new method, and where there are matters of importance in relation to pharmacists, I have endeavored to give all that was connected with them in a satisfactory abstract, and I think that that will not be objected to. So I might go on as to portions which might be criticised. Gentlemen, the report has been on my heart—I say so—on my heart, and you have given me the results of your criticism. Now I want to say to you I do not feel right as to Mr. Ebert's waiting until this late day, Sunday night, to tell me his objections. I do not feel that it was just. I think it is unjust. Some one of you might come to me and tell me what you considered not right or not necessary. Do you consider, or can you consider since you have made me your officer, that I am going to go all around the country as to questions of this kind? Of course, I have my individuality, you see it in this work, and so long as I am the reporter, the work will be performed to the best of my ability and power. I am in this thing for honor, and am a candidate for no office in connection with the American Pharmaceutical Association. I am anxious to make it the best possible work that I am able to make it, and to come up to all the requirements of the Reporter on the Progress of Pharmacy. I want you to consider how the work has been done. We all know that any man may review any work upon which 25 years of labor has been placed, and may tear the author all to pieces. It is perfectly right, and I am glad to have this criticism; I am glad to have the opportunity to bring before the Association the value of this report. You don't realize it all. You will see it in time, and there is more contained in it than can be seen at a glance. I must say that, although that is something I ought not to say. (Applause.) But gentlemen, I want to call your attention to some of these articles. But first I want to read to you from Article 3, Chapter V. of the By-laws, a few words as to the duty of the Reporter on Progress of Pharmacy. It reads as follows: "From these and other available scources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materia Medica, and the collateral branches of knowledge; on the changes in conditions of pharmaceutical institutions; together with such statistical, biographical and obituary notices as will furnish an epitome of the progress and changes in the science and practice of pharmacy, and of its votaries at home and abroad."

Gentlemen, I do not propose to go through the report and consider everything, or to apologize for the report. One criticism of Mr. Ebert was with reference to the use of the dash, instead of printing the title of the article every time. For instance, I will turn to cholera, ammonium chloride in treatment of.

And next you see cholera bacilli, and next cholera bacillus, and so on, the word cholera being printed once for nineteen headings. I never allowed that dash if I could prevent it in my work, and it is a great deal of work for me to put that dash there, because in my work very likely in making the change in the abstract will cause a change in the arrangement, and all these headings are on top. Now, when I come to prepare that report I cut out those headings and put the dash, as I paste them on to a piece of paper, and it makes work. I think it really a convenience, although Mr. Ebert may not so consider it, and I don't know whether I will consider his criticism so much, as it is a matter of minor importance. It is much easier to leave them out, and it will depend upon what experience some others may have. I think that explanation is just to the Association. (Applause.)

PROF. REMINGTON: *Mr. President:* I feel that in this matter of the Report on the Progress of Pharmacy we have been very closely associated, the reporter and myself, for the last year in preparing this report, so that it would not be right for me to keep my seat without making a few remarks. I am familiar with the industry of your Reporter on the Progress of Pharmacy, and I know the time he has put upon the compilation of that report, and I am also familiar with the remarks and criticisms which have been made upon the proceedings in former years, and I have had a special interest in the proceedings of this year, as you can well imagine, to look up reports, remarks and criticisms which have been made both abroad and here upon this Report on the Progress of Pharmacy, and I am prepared to say that no report has ever been published as far as I know in any preceding session that has been so universally commended. With regard to the minor criticisms that have been made, I think it is perfectly right for our friend, Mr. Ebert, to get up here in the meeting and say in what particular the report does not suit him. He has a perfect right, and if we would all do that, I know the report would be benefitted. Mr. Ebert does not show you the inutility of the reference to books. But are there not other members who want that information as Prof. Sayre has said? It is the greatest good to the greatest number. With regard to those dashes, I can explain that to some extent. It is an advantage in some respects, and there is another practical advantage, it presents the appearance of the page looking uniform without the repetition of the heading, and the printer would have used so much italic type in repeating those names over and over again, that it has been the custom for many years to use these dashes. The point is here open for discussion, and it may be a question whether they have been used to advantage, and there are certain other little matters all of which must be left, and which have been left, to the Reporter and to the Secretary. I am sure upon the whole the report has received the greatest commendation.

MR. WHELPLEY: There is no doubt but that the Report on the Progress of Pharmacy is the most valuable work that the American Pharmaceutical Association is accomplishing, and that being the case, we should all admire the example that Mr. Ebert has set by being the first to openly criticise the report. I think that each one should follow this example whenever they have an opportunity. On the other hand, I think the Association is to be congratulated in having a Reporter on the Progress of Pharmacy, who will get up and say as long as I am reporter that report will have individuality; make your criticism, I will consider them and do what I decide is right. What kind of a report would you have if such person were the Reporter and each one should make criticisms and they were followed? That is the way I look at it. Let each one criticise, and let the Reporter decide. It is the same with the daily papers: what kind of daily papers would we have if each one had their say-so in editing? It is the same with this report. Now as to Mr. Ebert's remarks about these citations, at first I felt his criticism was that the reporter had not given us sufficient information; he has not been succinct.

MR. EBERT: I did not say that.

MR. WHELPLEY: If that is the case it does not harmonize well with Mr. Ebert's criticism, that we cannot afford to give the space.

MR. EBERT: I will answer that if you will allow me. I want to say now if these citations were giving us information, then they would be of value. I will use a simple illustration if you will allow me.

MR. WHELPLEY: I yield the floor for a few minutes.

MR. EBERT: The first thing which called my attention to it was this: I had no time really to write to the Reporter. A gentleman brought into my store a sample of American musk, so-called, and incidentally in going over these reports I had seen a heading on American musk. I did not know what American musk was, not having heard of it, and I had never seen the article, and this specimen was before me, and having seen the heading American Musk, and remembering that I had seen such a heading in the Proceedings of this year, I looked into the index, and to my astonishment I found under the heading of American Musk a reference to a certain journal and a certain page. I had not the journal before me, and I had not the time to look it up, and the very information I wanted I did not get. That called my attention to the fact that that was what was wanted in the Report on the Progress of Pharmacy—instead of these citations being given, we should have the information. Then there are 75 names of foreign publications, and only 25 American, and I was unable, as an ordinary pharmacist, not as a teacher or as a journalist, to have such a library to consult.

Mr. Whelpley: Mr. Ebert's explanation has somewhat cleared the incongruity that I detected when his statement was first made. I agree with Mr. Ebert that the Reporter on Progress of Pharmacy should as far as possible follow the idea of giving practical points in all of those articles that are intended more particularly for the retail druggists. All of us do not have access to such publications; he should give citations on such topics as would be referred to by investigators, by professors, by editors, by compilers, by authors, and those who have libraries of considerable extent at their command. That is a criticism that I would make for the benefit of the Editor of the Proceedings or for the Reporter on Progress of Pharmacy—to make the report first as useful as possible to retail druggists, for they comprise the greater number of our constituency, and next come the authors, compilers, and workers in various regions.

Mr. Sayre: I hope this discussion will not be prolonged. We have wasted time, I feel. So far as these suggestions go, they could all have been made personally, as I have made suggestions personally, and I am surprised that they should be brought up in this way to prolong discussion. I want to say with regard to the very point that has been made, this point has been foreseen by the Reporter himself, and he has told me his next report would have the very characteristics that we are speaking of now.

Mr. Hallberg: I would like to say a word or two on this question, and I have been trying to get the floor for the last half hour. I think we have a right to express ourselves. I, in the first place, desire to differ from Prof. Sayre; at first I rather agreed with Mr. Ebert, that Mr. Kraemer should not collect editorial expressions from drug journals nor report notices, nor enumerate papers of State Associations; but under the By-laws, Article 3, Chapter V., it is prescribed as one of his labors, and he has got to do it if he desires to fill the bill, and I think that for the little space that the enumeration of the subjects from different State Associations every year takes in the Proceedings, I think it is a most valuable collection, and it reflects the Progress of Science. As for the others I think the members of the Association will admit that if he is to extend, no matter how briefly, this bare reference, it is going to increase the size of the volume very much. Now, inasmuch as the book must be limited, and inasmuch as the expense also is to be kept down to the lowest possible point, it is possible to compromise by making a bare reference, quoting the name of the journal in which the article appears, rather than to take no notice of it whatever. Mr. Ebert knows that most pharmacists are so situated that they can apply to the college or journal for information on a question of that kind, when the information cannot be found in the report. The value of the report is that it presents a collective and comprehensive enumeration, if nothing else, of everything that has appeared on the Progress of Pharmacy during the year, and that is the real value of the report. We have got lots of journals and all sorts of literature, but there is only one work which comprises a reference to everything as soon as published. I desire also to state that I believe there is no book published in any language that presents a better report on this work than do the Proceedings of this Association. (Applause.)

The question being on the acceptance and adoption of the report, it was agreed to.

MR. HALLBERG: I don't know whether it is in order now, but I would say Chapter V. Article 2, of the By-laws, says that "All journals and volumes received in exchange for the Proceedings, by the Permanent Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report on the Progress of Pharmacy." I have never heard any reference in the report as to the journals, books, etc., that have been received by this Association in exchange for its report, and if it is not proper now, I would like to bring the question up at some other time. It seems to me that this Association, forty-two years of age, ought to have a vast library, and if we have not any such library, then it is pretty near time, it seems to me, to begin now to preserve all this literature.

Mr. Fennel then read the following report, which, on motion, was accepted and adopted:

The Committee on Credentials, appointed by the Council, beg leave to report that they have performed the duty assigned them, and find that delegates have been duly accredited as follows:

Colleges of Pharmacy.—Cincinnati, Illinois, Louisville, Maryland, Massachusetts, Montreal, National, New York, Philadelphia, Purdue, St. Louis.

State Pharmaceutical Associations.—Alabama, Colorado, Connecticut, Delaware, Florida, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Virginia.

Alumni Associations of Colleges of Pharmacy.—Chicago, Maryland, New York, Philadelphia, St. Louis.

Local Associations.—King's County, N. Y., New York D. A. Verein, Norfolk and Portsmouth, Va., Province of Quebec.

Medical Associations.—American Medical Association.

Signed, CHAS. T. P. FENNEL, *Chairman,*
CHAS. E. DOHME,
CHAS. CASPARI, JR.

The President having called for the report of the Committee on National Formulary, the chairman, Mr. Diehl, read the following report, which was received with great applause:

To the American Pharmaceutical Association:

The chairman of this Committee has the honor to report that, with the aid of the chairmen of the Sub-committees on Corrections, Eliminations and Additions, he has again reviewed the proposition made for the revision as detailed in previous reports, and received since, and has arrived at conclusions which confirm the opinions expressed in the concluding remarks of his report submitted to the meeting in 1893, viz.:

1. That the defects in the formulas are few, and are easily remedied.

2. That, notwithstanding the prevalent opinion that large additions should be made to the "Formulary," the number of desirable additions is really very small.

3. That when eliminations shall have been effected, the number of formulas dropped because of admission into the new Pharmacopœia (1890) will be largely in excess of the new ones adopted, and a revised "Formulary" will therefore be contracted rather than augmented in its volume.

It is quite possible that the paucity of additions to the "Formulary" will prove a disappointment to many, and to such some explanation is due. When the "Formulary" was issued in 1888, it embraced practically all preparations that were in established use and for which there existed no uniform or authorized standard. These preparations had, for the larger part, been in demand for years, but differed in their formulas as made in various sections or by different dispensers, so that pharmacists were compelled to keep on hand a variety of brands of what was intended to be one and the same preparation, to satisfy the demands of their patrons. In a paper on "The National Formulary," read in the Section of Materia Medica and Pharmacy, at the Forty-fourth Annual Meeting of the American Medical Association (Milwaukee, 1893), the chairman of the committee endeavored to explain the evolution in the character of medicinal agents supplied for the use of physicians, and some quotations from this will be pertinent to this subject:

"It is but common justice to concede to an inventor proper recompense for his time, trouble and expense, and also a reward for his invention. Our patent laws secure this to him, so far as his invention may meet with popular use and demand; but under our patent laws everything must, or should, be open and above-board. A knowledge of how a patented article is made is public property, while it is the patentee's property to make, or to give the right to make it. And so A, for example, if he had succeeded in obtaining a patent for gelatin-coated pills, and declined to give consent to others, would have been the only manufacturer of gelatin-coated pills. But, insomuch as A did not secure a patent for gelatin-coated pills, the process being known and easily executed by any one competent to make pills, why should the preference be given to B, when A, C and D can make and do make them just as good? The point made is simply for the sake of argument, and applies with equal force to all preparations, the formulas of which are authoritative or that are honestly offered under honest titles.

"That this is the correct view is evidenced by experience and practice; for it is becoming more and more the practice of prescribers to omit the designation of the manufacturer when prescribing preparations of authoritative or well-known composition, the prescriber leaving the responsibility of quality to the dispenser. Manufacturers were not the last to recognize this tendency; on the contrary, they found that unless resort was had to some new expedient, they would soon again be in their original position; that is to say, directly dependent upon the pharmacist for the demand for their products. And we must look for an explanation for this again to the effect of competition, for manufacturers have increased almost as fast as new preparations. Not alone that many separate manufacturing establishments have been opened; the shrinkage of profits in the wholesale drug business has prompted almost every wholesale house to open a laboratory for manufacture in connection with their regular business. All of these, with few exceptions, have accepted and adopted the new expedient, which consists in introducing some preparation of popular drugs under a specific trade name. A palatable or presentable preparation having been secured, it suffices to give it a name, derived from its most prominent constituent, or from the specific term applicable to its medicinal use, or to prefix the manufacturer's name to a more or less abbreviated title of the preparation, and the manufacturer has a product which must be purchased from him, and cannot be substituted with impunity by the product of another manufacturer. To the prescriber it appears to make no difference whether the composition of the preparation is clearly indicated on the label or not, and generally it is not; the 'essential principle' of so many grains of this, that or the other, or of a teaspoonful of cod-liver oil, certainly do not give us a clear conception of the preparation before us. In point of fact, many of these preparations are simply such as are commonly designated as 'patent medicines,' though they may by courtesy be called 'pharmaceutical specialties.'"

Now, while in past years we had to deal with preparations introduced under titles *more or less honestly indicative* of their composition, we are now confronted with a host of preparations which are introduced under specially coined trade names, and which, even if their exact formula is known, cannot be replaced by the product of any other manufacturer than the one owning the trade name. It is clearly beyond question, therefore that formulas for such preparations should be introduced into the "Formulary," and inasmuch as preparations of this character constitute the largely preponderating number of "pharmaceutical specialties" introduced since the original publication of the Formularly, very few new formulas can be added in a revised edition.

The changes which have been definitely agreed upon by the Committee are the following:

1. *Construction of Formulas.* When one formula is used in the manufacture of another, the number of the formula is to be given as well as the name, and in the case of official preparations so directed, the title is to be followed by the letters U. S. P.—thus:

ELIXIR PILOCARPI.

Fluid extract of Pilocarpus, U. S. P.	1 fluid ounce.
Syrup of coffee (353)	3 fluid ounces.
Tincture of vanilla (U. S. P.)	½ fluid ounce.
Comp. elixir of taraxacum (105), enough to make	16 fluid ounces.

2. *Weights and Measures.* The avoirdupois and apothecaries measure are to be replaced in the formulas by metric weight and measure.

3. *Elixirs.* "Adjuvant Elixir" is to be replaced by "Aromatic Elixir, U. S. P." in the formulas in which it is now directed.

4. *Emulsions of Cod Liver Oil.* Preference shall be given to "Acacia" as an emulsifying agent over "Mucilage of Irish Moss," which is given the preference in the present "Formulary." In accordance with this, Formula II of the alternate formulas for "Emulsions of Cod Liver Oil" (114), shall be given in the revised edition as Formula I, and Formula I becomes Formula II. Of the "Compound Emulsions of Cod Liver Oil," 115, 116, 117, 119, 120 and 121, will be made with "Acacia," whilst "Emulsion of Cod Liver Oil and Malt" (118) will, as heretofore, be made with "Mucilage of Dextrin." The relation of acacia, oil and water, to effect the emulsion, will be: Acacia, 2; oil, 8; water, 3, the remainder of the compounds being added when perfect emulsion is effected.

5. *Pepsinum, U. S. P.. and Pepsinum Saccharatum, U. S. P.*, are to be used weight for weight respectively in place of the corresponding N. F. preparations (dismissed) when called for in the Formulas.

6. *Purified Talcum* is to be replaced by "Magnesium Carbonate," for the clarification of all liquids now directing the former, with the exception of those containing acids or pepsin.

7. *Spiritus Aromaticus and Spiritus Aurantii Comp.*, being both dismissed from the "Formulary," the prepartions requiring their use are to be made with "Spiritus Aurantii Comp., U. S. P."

8. *Formulas dismissed from the "Formulary" by reason of admission into the U. S. P., 1890:*

Acidum Hypophosphorosum Dilutum (3).
Aqua Chloroformi (5).
Boroglycerinum* (10).

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* Official as "Glyceritum Boroglycerini."

Caffeinæ Citras Effervescens (11).
Elixir Aromaticum (31).
Elixir Phosphori (85).
Emulsio Chloroformi (113).
Extractum Apocyni Cannabini Fluidum (129).
Extractum Asclepiadis Tuberosæ Fluidum (132).
Extractum Aspidospermatis Fluidum (133).
Extractum Convallariæ Radicis Fluidum (143).
Extractum Eriodictyi Fluidum (148).
Extractum Lappæ Fluidum (159).
Extractum Phytolaccæ Fluidum (163).
Extractum Rhamni Purshianæ Fluidum (165).
Extractum Scoparii Fluidum (167).
Extractum Viburni Opuli Fluidum (176).
Glyceritum Acidi Tannici (182).
Glyceritum Boroglycerini (184).
Glyceritum Hydrastis (185).
Mistura Rhei Compositæ (261).
Pancreatinum (278).
Pepsinum (279).
Pepsinum Saccharatum (281).
Pilulæ Catharticæ Vegetabiles (291).
Pilulæ Ferri Carbonatis (295).
Potassii Citras Effervescens (306).
Sapo Viridis (329).
Spiritus Amygdalæ Amaræ (336).
Spiritus Aromaticus (337).
Spiritus Aurantii Compositus (338).
Spiritus Phosphori (344).
Syrupus Acidi Hydriodici Decoloratus (350).
Tinctura Quillajæ (410).
Tinctura Strophanthi (415).

9. *Formulas retained in Formulary notwithstanding admission into the U. S. P.:*

"Extractum Zeæ Fluidum" (177), because, while indicated under "Zea," no formula is given in the U. S. P.

"Ferri Hypophosphis" (179), because there are two useful formulas given for its preparation, and there are none in the U. S. P.

"Oleatum Zinci" (273), because the product of the "Formulary" is pulverulent, and such as is desired by physicians, whereas the U. S. P. product is a plaster-like mass.

10. *Change of Titles.* It has been decided to change the titles of the following preparations:

"Aqua Hamamelidis" (6), to "Aqua Hamamelidis Spirituosa."
"Oleatum Zinci" (273), to "Oleatum Zinci Pulveratum."
"Pulvis Iodoformi Dilutus" (315), to "Pulvis Iodoformi Compositus."

11. *Corrections of Formulas.* The following formulas are to be corrected in conformity with the suggestions of the Sub-committee on Corrections of Formulas, as given in the report of this committee in 1893. (See Proceedings 1893, pp. 46–49.)

Elixir Ammonii Valerianatis (27).
Elixir Cinchonæ (27).

Elixir Ferri Phosphatis, Quininæ et Strychninæ (63). Except that the strength of the finished product shall hereafter be as follows: Each fluidrachm is to contain 1 grain of soluble phosphate of iron, $\frac{1}{2}$ grain of quinine alkaloid, and $\frac{1}{64}$ grain of strychnine alka-

loid. This corresponds practically with the composition of most of the commercial elixirs of the same name.

Elixir Gentianæ (67).
Elixir Quininæ et Phosphatum Compositum (93).
Elixir Rhamni Purshianæ (95).
Elixir Rhamni Purshianæ Compositum (96).
Elixir Rubi Compositum (99).
Elixir Taraxaci Compositum (105).
Emulsio Olei Terebinthinæ (122).
Lac Fermentum (193).
Liquor Zinci et Ferri Compositus (241).
Mistura Copaibæ Composita (256).
Syrupus Ferri Citro-Iodidi (363).
Tinctura Antiperiodica (390).

12. *Corrections of Formulas referred for final action to Sub-committee on Corrections*

"*Elixir Chloroformi Compositum*" (41). To be corrected by the addition of sufficient alcohol to produce a permanently clear paeparation.

"*Elixir Cinchonæ et Ferri*" (45). To be made from an elixir of cinchona prepared directly from the alkaloids. Elixir Quininæ Compositum (92), being proposed.

"*Liquor Bismuthi*" (207). To be prepared direct from citrate of bismuth and ammonia only, glycerin being added in quantity to correspond to the preparation made from glycerite of bismuth (183).

"*Mistura Chloralis et Potassii Bromidi Composita*" (253). To be adjusted so that the final product shall measure 16 fluidounces in the proportions now given; also to consider the propositions that have been made with a view of securing a more homogeneous preparation than the present formula produces.

"*Mistura Chloroformi et Opii*" (254). A more satisfactory formula is promised by the Chairman of the sub-committee on correction.

"*Sal Carolinum Factitium Effervescens*" (323). To consider the advisibility of replacing one-half the citric acid by tartaric acid, with the view to securing firmer granules and a whiter product.

13. *Additions to the Formulary.*

"*Hypodermic Tablets and Tablet Triturates.*" It is proposed to give general directions for the preparation of these. As basis for "Tablet Triturates," *milk sugar* has been decided upon; for "Hypodermic Tablets" the most useful base appears to be *cane sugar.*

"*Liquor Magnesiæ (Sulphatis) Effervescens*" proposed by Mr. Henry R. Gray, Montreal, by the formula on p. 42, Proceedings 1893.

"*Syrupus Codeini Sulph.*" proposed by Mr. Henry R. Gray, to be made of the strength of $\frac{1}{2}$ codeine sulphate in the fluid drachm, in Proceedings 1893, p. 42.

"*Elixir Paraldehyde*" proposed by Mr. S. L. Hilton, Washington, D. C. The strength of this to be increased to 20 per cent. or 25 per cent, paraldehyde. See Proceediugs 1893, p. 42.

"*Elixir Digestivum Comp.*" proposed by Mr. S. L. Hilton, Washington, D. C. See Proceedings 1893, p. 42. A certain proportion of hydrochloric acid has evidently been omitted in this formula, and should be added.

"*Glyceritum Guaiaci*" proposed by Mr. S. L. Hilton, Washington, D. C. See Proceedings 1893, p. 43.

"*Syrup of White Pine Comp.*" proposed by Mr. S. L. Hilton, Washington, D. C. See Proceedings 1893, p. 43.

"*Tinct. Viburni Opuli Comp.*" proposed by Mr. S. L. Hilton, Washington, D. C. See Proceedings 1893, p, 43.

"*Solution of Bromide of Gold and Arsenic*" suggested by Mr. Fred. A. Sieker, New York (see New Remedies, December 1893).

"*Aromatic Fluid Extract of Cascara Sagrada*" suggested by Mr. Fred. A. Sieker, New York. According to formula in the hands of Committee, the amount of calcined magnesia to be increased, however, so as to equal one-eighth of the weight of cascara employed.

14. *Epitome of the Formulary.* It is voted by the Committee that it is desirable to issue an "Epitome" of the National Formulary for the convenience of physicians.

15. *Popularization of the Formulary.* In a former report (1892) the Chairman made the following observations respecting the popularization of the National Formulary:

"The Formulary has, as a whole, proven an acceptable aid to pharmacists for making many of the preparations in popular demand, and as a convenient work of reference for formulas of preparations that have been official in the past, or have become obsolete, and for which the demand is ephemeral. Nevertheless, it is not used nearly as extensively, nor adhered to as closely, as it deserves, taking into account only the character of its excellency, and leaving out all ethical considerations. The causes that determines this lukewarmness are doubtless many, but most prominent among them are the successful efforts of manufacturers of specialties to introduce their goods to the favorable notice of physicians, and the difficulty to enlist the physicians into sympathy with the object aimed at by the Formulary. It is clear that without the active support of practitioners of medicine, the Formulary must fail in its most important objects—uniformity of formulas for certain non-official preparations, and displacement of proprietary specialties. Several suggestions are made in this direction, such as free and liberal distribution of the Formulary or a commentary to it among physicians, the presentation of N. F. Preparations to them, etc., but all such efforts must come to naught, or redound at best only to the benefit of individuals, if the Formulary does not receive the same recognition by the National, State and Local Medical Associations that is accorded it by the corresponding Pharmaceutical Associations."

In harmony with these views the Chairman of this Committee communicated his paper "On the National Formulary" (already referred to) to the American Medical Association, and he is encouraged to think that it has aided to pave the way toward some favorable action by that Association in the near future. But others have taken hold of the subject in a more practical way, and it is a pleasure to call attention to the method of popularizing the "Formulary"—not alone among physicians, but also among pharmacists,—inaugurated by Mr. Robert J. Snyder at the recent meeting of the Kentucky Pharmaceutical Association (May 1894) over which he presided. Shortly after the adjournment of his Association in 1893, he addressed the members with the request that each member should select one of the preparations of the Formulary,—from among a representative list submitted—and that he make a quantity of the preparation selected in time for exhibition at the annual meeting in 1894. The product so made was to be divided among some twelve or sixteen small containers, and each container labeled with a neatly printed label, corresponding in style and type with one submitted, giving the title of the preparation, composition and dose, the statement that it was made in strict accordance with a formula of the "National Formulary," and submitted for inspection to the Kentucky Pharmaceutical Assoeiation; but the name of the maker was directed to be omitted on this label. The preparations so prepared and submitted were then to be placed in the hands of a special committee, with instruction to present the same for inspection, explanation and distribution at the meeting of the Kentucky Medical Association, to be held at a date later than the meeting of the Pharmaceutical Association.

This plan and the recommendations were carried out to the letter. Some sixty or seventy-five pharmacists sent in their preparations, and they were a revelation to those that had the opportunity to inspect them, since they gave evidence, not alone that the "Formulary" assured satisfactory preparations, but that every one of the sixty or seventy-five pharmacists of the Kentucky State Association who had presented preparations were careful and conscientious workers. The preparations were in due time exhibited at the meeting of the Kentucky Medical Association, and they attracted more attention than anything that was on the programme. Indeed, the Association voted that the physicians of Kentucky should, as far as practicable, prescribe the preparations of the National Formulary, and give preference to them whenever a discrimination can be made.

By the courtesy of the gentlemen having charge of these samples of "Formulary" preparations, the chairman is enabled to present some of these at this meeting for inspection. It is believed that not the least benefit that resulted from their exhibition, so far as the meeting of the Kentucky Pharmaceutical Association is concerned, was the fact that many of the pharmacists in attendance saw for the first time an extensive line of National Formulary preparations, saw the possibilities of the "Formulary," and became convinced that the preparations were easily made, and the only non-official preparations to push and to foster. It is therefore urged that other State Pharmaceutical Associations fall in line, and by the same or similar methods secure the attention of physicians as well as pharmacists to the "Formulary." If, then, the Association shall find it proper to issue an "Epitome of the Formulary," a certain number of copies of which shall be supplied gratuitously with each copy of the revised "Formulary"—possibly also to each State Medical and Pharmaceutical Association—it is believed that we shall succeed in effectually popularizing the National Formulary. Respectfully submitted,

C. LEWIS DIEHL, *Chairman*.

Upon motion, the report was received, and the thanks of the Association tendered the Committee for the valuable work done.

THE PRESIDENT: Gentlemen, you have heard a very important report of the Committee on National Formulary, one which contains some very important suggestions to be adopted; are these to be adopted without consideration? What is your pleasure in regard to the report?

PROF. REMINGTON: I think in view of the very important character of this report, to give it proper consideration and attention it should be referred to a special committee for consideration, and I move the appointment of a committee of three to whom the report shall be referred, and who shall report thereon at the last session of the Association, in order that we may discuss it.

This motion was seconded and agreed to.

THE PRESIDENT: I will appoint on that committee, Prof. Good, Chairman; Mr. Alpers and Mr. Cornell.

MR. EBERT: Mr. President, I would like to ask the Committee on National Formulary whether it would be in order for them to accept and introduce a preparation that was formerly official, and which since has given us a great deal of trouble, and does so at the present time, so as to have in that way another formula. To make it clear, zinc ointment pharmacists are having a great deal of trouble with, in dispensing; officially it contains too much of the oxide of zinc. Would it not be proper to introduce a new formula? The old official formula was always satisfactory.

THE PRESIDENT: I think the Committee would entertain the suggestion without any action upon it.

Mr. Alexander presented the following resolution from the American

Medical Association, which was upon motion referred to the special Committee appointed to consider the report of the National Formulary Committee :

At the Forty-fifth Annual Meeting of the American Medical Association held in San Francisco, California, in June 1894, the following resolution was unanimously adopted:

Resolved, That the American Pharmaceutical Association be invited to contribute to the Journal of the American Medical Association, reports of and examinations of proprietary and secret nostrums made under its direction. The officers of the Section on Materia Medica and Pharmacy to act with a committee to be appointed by the American Pharmaceutical Association, as a Committee of Conference in order to carry this resolution into effect.

MR. HALLBERG: I have a communication from the Chairman of the Section on State Medicine of the American Medical Association which relates clearly this question, and I want to know whether it would be desirable to bring it in here now or afterwards. The Chairman of the Section on State Medicine of the American Medical Association, Dr. Liston H. Montgomery, of Chicago, requested me to present this subject before this Association. The action of the Section on State Medicine of the American Medical Association is with reference to the possible enactment of legislation to regulate patent medicines and proprietary medicines.

If the Association desires, it will only take about three minutes to read the communication.

COMMUNICATION FROM SECTION ON STATE MEDICINE OF THE AMERICAN MEDICAL ASSOCIATION.

At the last annual meeting of the American Medical Association in San Francisco, California, a paper was presented to the Section on State Medicine, Thursday June 7th, by Dr. Samuel P. Duffield, of Detroit, Michigan, entitled "State Medicine: Its Relation to Patent Medicine," the paper being read by the Chairman, Dr. Geo. W. Stone, in the absence of the author. Instances were cited by the author where persons were beguiled into the belief that they could be benefited by the use of various nostrums even though it be at the cost of as much as ten dollars for the first payment. These often successful efforts to play upon the ignorance and credulity of the unwary were exploited through advertising in newspapers, by the distribution of printed circulars and by traveling fakirs, itinerant quacks and peddlers.

Various patent remedies to quiet certain "nervous conditions," to "restore lost vitality," etc. were scored. The attention of the Postmaster General as well as that of Congress should be called to this use of the United States mails for the purposes of deception, and the postal authorities should be requested to exclude all such polluting prints from the mails.

The Patent office was censured for affording protection through trade marks and copyrights to persons without any skill, knowledge or experience to manufacture, promiscuously recommend and sell secret compounds so powerful in their effects as to often permanently impair health and sometimes destroy life.

This paper was discussed by a number of prominent physicians, Drs. Thos. Ross, J. H. Stallard, of London, England; C. A. Ruggles, President California State Board of Health; J. H. Davisson and M. F. Price, of Los Angeles. As suggested by the author, a committee was appointed to consider some method of procedure for the purpose of investigating the composition of the various proprietary remedies advertised in medical journals and newspapers, etc. The Committee was empowered to bring the question of regulating patent medicines before Congress, to confer with the Attorney General, the Postmaster General, the Patent Office, postmasters and to co-operate with similar Committees from other Associations, allied for the improvement of the public health.

The investigation refers to examination of the whole proprietary system in medicine, copyright laws, trade marks and the monopolies resulting therefrom, as being, in the opinion of the Chairman of the Section on State Medicine, unconstitutional and therefore illegal, unwarranted and unscientific, and to be prohibited by statutes.

The committee appointed consists of Dr. Thomas Ross, Sacramento, California, Dr. J. H. Stallard, San Francisco, and Dr. Liston H. Montgomery, Chicago.

Signed, LISTON H. MONTGOMERY, M. D., *Chairman.*

I desire to add, Mr. President, that the Chairman of the Section on State Medicine of the American Medical Association is going to bring this matter before the American

Public Health Association, which meets in Montreal on the 24th of September. If this Association appoint the Committee, it should be instructed, if possible, in reference to this subject, to send a delegate to the American Public Health Association at its meeting in Montreal. It is believed that if the American Medical Association, the American Pharmaceutical Association, the American Public Health Association, and the members of these national organizations who are interested in the benefit of the results of the public health, are allowed to concentrate their efforts, something may be done in the way of legislation against this intolerable patent medicine nuisance.

THE PRESIDENT: You have heard this communication from the Section on State Medicine of the American Medical Association, apparently in direct line with the communication previously received; what is your pleasure?

MR. ALEXANDER: I move that it be received, and referred to the special committee having in charge the communication from the American Medical Association.

Agreed to.

The Secretary read the report of the delegation to the American Medical Association, as follows, which was, upon motion, accepted and adopted:

REPORT OF THE DELEGATION APPOINTED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION TO THE SECTION ON MATERIA MEDICA AND PHARMACY OF THE AMERICAN MEDICAL ASSOCIATION.

The forty-fifth annual meeting of the American Medical Association convened in San Francisco June 5th, 6th, 7th and 8th, with an attendance of six hundred delegates from all parts of the United States.

The meeting was called to order and presided over by the President, Dr. James F. Hibbard, of Indiana.

General addresses of welcome were delivered on behalf of the city and the medical profession of California.

Dr. Hibbard was presented with a beautiful gavel, emblematic of California, the body being made of manzanita, and the handle of orange wood.

The Oregon Medical Society presented each Section with a gavel, the mallets of which were myrtle, and the handles of yew. Dr. Hibbard delivered the annual address to an audience of fifteen hundred delegates and physicians, which was listened to with the closest attention and interest.

The various working Sections were represented by several hundred members, including many of the most eminent physicians in America.

After the transaction of official business of the Association, valuable papers, numbering sixty-three, were read and discussed in the respective Sections, not including papers read by title on account of the absence of their authors.

The Section on Materia Medica and Pharmacy met June 6th, Dr. Frank Woodbury, Chairman, who congratulated the members of the Association upon the good work which has resulted from the combined and harmonious action of the two Associations, the American Medical Association and the American Pharmaceutical Association.

The first paper of this Section was read by Dr. H. A. Holmes, of Portland, Oregon, on Viburnum Prunifolium. The speaker praised the utility of this drug in cases of excessive uterine hemorrhage, and also cited three instances where its use gave the most happy results in threatened abortion. Drs. Browning and Hanson gave confirmative testimony as to its value in various forms of dysmenorrhea.

A paper by Professor Remington on The New Pharmacopœia was, on account of the absence of the author, read by title.

Dr. Jones, of San Francisco, read a paper on the Therapeutic Uses of Potassium Permanganate. The speaker commented upon the various uses which have been made of this salt. The conditions in which it has proved useful are: chronic gastritis, phosphorus poisoning, gouty conditions, obesity, functional dysmenorrhea, and diseases of the bladder.

Prof. Wm. M. Searby read a paper entitled Prescribers and Dispensers. He pointed out how much of the fault is due to the physician and how much to the pharmacist; and that physicians, by prescribing proprietary articles, do more harm than the counter-prescribing of the retail druggist.

Dr. Browning read a paper on some of the uses of chloralimid. He found this remedy beneficial in epilepsy, beginning its use in doses of gr. xv, and in severe cases increasing it to ʒi, every six hours. It does not depress either the nervous or circulatory system.

Prof. W. T. Wenzell, after some introductory remarks regarding a similarity of structure of microbic cells and the macroscopic yeast-cells, read an essay on the chemistry of bacteria. The paper showed considerable original work, and the author was complimented on his rapid advance in this most interesting line of chemical research.

The Section introduced and adopted the following resolution:

Resolved, That the American Medical Association directs the attention of medical colleges of this country to the general neglect of the study of botany by medical students, and that it is the sense of this Section that the teaching of general descriptive botany be made a part of the curriculum in every medical school, and heartily endorsed by the delegates of the American Pharmaceutical Association.

The session closed on the fourth day of the meeting, after the election of Dr. Donald McLean, of Detroit, President, and the various officers for the ensuing year.

For the Section of Materia Medica and Pharmacy, Professor Whelpley, of St. Louis, as Chairman, and Dr, Hanson, of San Francisco, as Secretary, were re-elected.

Place of next meeting of the Association will be at Baltimore, Maryland; Julian J. Chisholm, Maryland, Chairman of Committee on Arrangements.

W. T. Wenzell, *Chairman.*

Prof. Whelpley then presented the following motion:

Moved that the Secretary of the American Pharmaceutical Association be instructed to inform the publishers of all Pharmaceutical Journals, the Secretaries of all Pharmaceutical Asssociations and other scientific bodies interested in Pharmacy, that their publications and proceedings will be very acceptable to the American Pharmaceutical Association, for the use of the Reporter on the Progress of Pharmacy.

Signed, H. M. Whelpley.

Seconded by W. C. Alpers.

After discussion by Messrs. Thompson, Whelpley, Ebert, Hallberg and Morrison, the motion was finally agreed to.

The report of the delegates to the Pan-American Medical Congress was next read by the Chairman, Mr. Thompson, who stated that Mr. Ryan had regularly attended the sessions of the Congress and had made up the report.

REPORT OF THE COMMITTEE TO THE PAN-AMERICAN MEDICAL CONGRESS.

Your Committee is pleased to report that, they were present at the first Pan-American Medical Congress, held in the City of Washington, in September, 1893. The gathering was a most notable one, there being present a great number of the most prominent medical men of the Western Hemisphere. The republics and Colonies of South Americn were particularly well represented. The work of the Congress was marked, not only for the high scientific character of the papers presented, but also by bringing about a much closer relationship between the professions of medicine and pharmacy of North and South America. The Congress elected for its President Dr. William Pepper, of Philadelphia, and as Secretary General Dr. Chas. M. Reed, of Cincinnati, and to these gentlemen much of the success of the Congress was due.

Of the many Sections of the Congress, by no means the least was the Section of Pharmacology, to which this Association was asked to send representatives. Our Ex-President, Jos. P. Remington, was elected Chairman of the Section, the Secretary being F. G. Ryan. A number of valuable papers were read upon pharmaceutical and botanical subjects. It is particularly gratifying to state that every resolution passed by this Section was accepted by the Congress and Committees appointed to carry out the work suggested.

A resolution was adopted providing for a committee to report upon a general plan for a Pan-American Pharmacopœia, the scope of which shall be to bring to a uniform standard all important medicinal agents in use in the Americas. Another provided for a committee to devise a plan for the systematic collection, study, and classification of medicinal plants of South America.

It will be particulary interesting to this Association to know that the Section on Pharmacology was especially complimented by the officers of the Congress for the work done.

Your Committee believe that the recognition and courtesies extended to them by this notable gathering of medical men was an expression of confidence in the scientific character of our profession, and will do much in the future the respect for our work by scientific medical bodies in general to increase.

The second Congress will be held in the City of Mexico in 1896.

Signed, F. G. RYAN,
CHAS. CASPARI, JR.,
W. S. THOMPSON,
Chairman.

The next report in order was that of the Committee on Revision of the Pharmacopœia, which was read by Dr. Whelpley:

REPORT OF THE COMMITTEE ON REVISION OF THE UNITED STATES PHARMACOPŒIA.

MR. PRESIDENT AND MEMBERS: The unprecedented sale and almost universal adoption of the Seventh Decennial Revision of the Pharmocopœia of the United States speaks more plainly than words of the success attained by the present Revision Committee.

This gratifying growth in the popularity and usefulness of our National Standard causes us to thirst for still greater success. The American Pharmaceutical Association is ever ready to aid and abet the Revision Committee to the full extent of their ability. We have increased our membership fully thirty per cent. since the call was made for the convention to elect the present Committee on Revision. With our growth in numbers we have added to our resources and enlarged our field of influence. Your Committee most respectfully and earnestly recommend the following:

1. That the American Pharmaceutical Association heartily approve of the Research Committee plan adopted by the United States Pharmacopœia Revision Committee.

2. What gives evidence of being a large and growing proportion of pharmacists and physicians favor the introduction in the United States Pharmacopœia of a list of the maximum doses of official remedies. The Arkansas Association of Pharmacists and the Missouri State Pharmaceutical Association have officially indorsed the proposition. We believe that the American Pharmaceutical Association should discuss the subject at this meeting.

3. The statistics of prescription files is the only true method of determining just what preparations, chemicals and drugs are prescribed by the physicians of this country. This information would be of great practical value in revising the United States Pharmacopœia. We suggest that the American Pharmaceutical Association urge the Committee on Revision of the United States Pharmacopœia to obtain reports from different sections of each State and Territory.

4. We urge that the American Pharmaceutical Association spare neither work nor money to contribute to the utility of the next revision of the United States Pharmacopœia in a manner becoming to this national organization.

Respectfully submitted,

H. M. WHELPLEY,
CHAS. CASPARI, JR.
C. S. N. HALLBERG.

Upon motion of Mr. Sheppard, the report was received and the recommendations contained therein, taken up *seriatim*.

The first recommendation was read, and upon motion adopted.

The second recommendation was read, and after a lengthy discussion, participated in by Messrs. Simon, Main, Thompson, Good, Whelpley, Ebert, Remington, Stewart and Alpers, the introduction of a table of maximum doses was recommended by adoption of the following resolution offered by Mr. Sheppard:

Resolved, That it is the sense of the American Pharmaceutical Association that a table of maximum doses should be inserted in the United States Pharmacopœia.

After reading the third recommendation, Mr. Sheppard moved that a copy of the same be sent by the Secretary to the Committee on Revision of the United States Pharmacopœia.

This motion was seconded.

MR. HALLBERG: I think it would be understood that this Committee on Pharmacopœia would send their report to the Committee on Revision.

MR. SHEPPARD: Let it come as an official notice from the Secretary of this Association to the Chairman of the Revision Committee of the Pharmacopœia.

MR. HALLBERG: I would like to ask the Chairman, Dr. Whelpley, whether we could not get more effective work if we would request State Associations to make these collective reports, rather than to have a Committee attempt to get a Report from each one of the States. Now in Illinois, at the last meeting, they adopted a resolution proposed by the Committee on the United States Pharmacopœia, requesting the Committee for the coming year to obtain a Report. This work was done in 1885 in Illinois, and there were tabulated 15,000 prescriptions, and it was very valuable; it seems to me we might get more effective work if the Committee requests the co-operation of every State and Association.

Dr. Whelpley: Do you make that as an amendment to the suggestion?

Mr. Hallberg: I would like to make that as an amendment.

The President: Before the Chair would entertain that motion, we would like to have the resolution placed in writing and then properly acted upon.

Mr. Hallberg: It is only necessary to add that the Committee obtain reports from State Associations, and that the Committee requests the co-operation of every State Pharmaceutical Association.

The President: The motion as it now stands is that the Secretary be instructed to send a copy of the resolution to the Chairman of the Committee on Revision of the Pharmacopœia.

Mr. Hallberg: I approve of that.

The President: Now if there is to be an amendment to that motion, I would like to have it placed in writing.

Mr. Hallberg: I wish Mr. Sheppard would defer this until we have time to do that.

Mr. Sheppard: I think it better to get in two motions.

Dr. Whelpley: Take Mr. Hallberg's motion first.

Mr. Sheppard: I think Prof. Hallberg's motion should be the second one.

The President: The question will be taken upon the original motion, that the Secretary be instructed to send a copy of this resolution to the Chairman of the Committee on the Revision of the Pharmacopœia.

Mr. Sheppard: I withdraw that, if the Association will consent, for the purpose of having Mr. Hallberg's motion presented first.

The President: Well, while that is being done we will proceed to consider the fourth recommendation.

The fourth recommendation was then read, and, on motion, adopted.

The President: While waiting for the amended resolution we will listen to the Report of the Chairman of the Transportation Committee. If Mr. Mayo is not present, we will listen to the report of Mr. Ebert, representing the Committee on the International Pharmaceutical Congress.

The Report was read, and, on motion, received and adopted.

REPORT OF THE COMMITTEE ON THE INTERNATIONAL PHARMACEUTICAL CONGRESS.

To the American Pharmaceutical Association:

The Seventh International Pharmaceutical Congress was held August 21, 22 and 23, 1893, at Chicago. Fourteen members were present from foreign countries, twelve of them being duly accredited delegates, while the number of delegates from American Pharmaceutical Associations, State Boards of Pharmacy and educational institutions was nearly 280. The Congress, notwithstanding the limited number of foreign delegates present, must be regarded as a success, because it unquestionably awakened fresh interest in certain important pharmaceutical questions in the United States.

Two of the members of this Association were especially honored by the Congress. The late Professor John M. Maisch, who for so many years occupied the important position of Permanent Secretary of this Association, had been awarded the Hanbury Medal, and the President of the Pharmaceutical Society of Great Britain was present at the Congress to present the medal, which was received on behalf of Professor Maisch by his colleague, Professor Remington, who was subsequently elected President of the Congress, and has since been appointed Acting Permanent Secretary of this Association.

The officers elected by the Congress were: President, Prof. Joseph P. Remington, of Philadelphia, Pa.; Vice-Presidents, Karl Fischer, of Austria, Emile Ramlot, of Belgium, L. W. Yeomans and E. Muir, of Canada; Michael Carteighe, Nicholas H. Martin and William Martindale, of Great Britain; Morten Nyegaard, of Norway; Thomas Ingham, of Queensland; William S. Thompson, of the District of Columbia; Albert E. Ebert, of Illinois; Lucius E. Sayre, of Kansas; Samuel A. D. Sheppard, of Massachusetts; Charles Rice, of New York, and Edgar L. Patch, the President of the American Pharmaceutical Association; Secretary, Oscar Oldberg, Chicago; Vice-Secretaries, W. L. Lachance, of Canada, M. T. Breslin, of Louisiana, and C. T. P. Fennel, of Ohio.

Among the transactions of the Congress your Committee would beg to invite attention to the following:

The Seventh International Pharmaceutical Congress declared itself unanimously in favor of the introduction of the Metric System in all of the Pharmacopœias, at the same time expressing the belief that liquids ought to be measured by volume and not by weight. The Congress also expressed itself in favor of the use of the Centigrade thermometer to the exclusion of other thermometric scales.

It voted unanimously that all who enter drug stores to learn the art of Pharmacy should be required by law to possess a sufficient preparatory education, and also that all persons licensed to practice Pharmacy ought to be required to have completed a definite course of training in a pharmaceutical school or college, and that both the preliminary education and the course of pharmaceutical instruction should be as advanced as the conditions of the practice of pharmacy in each country might permit. The Congress further voted that one of the conditions of registration or license of pharmacists should be at least four years' pharmaceutical experience, including the time required for the completion of the compulsory course of instruction at a pharmaceutical school. Examination alone was declared to be insufficient and unreliable as the legal test of the knowledge and skill possessed by candidates for registration as pharmacists.

The Congress appointed a Committee of three to take steps for the appointment of an international pharmacopœial commission to compile, publish and distribute an international Pharmacopœia of potent remedies, and it accepted with thanks the proffer by this Association of the sum of $1,000 to help defray the expense of compiling, publishing and distributing that Pharmacopœia of potent remedies. The said Committee consists of Prof. Joseph P. Remington, Chairman; President Michael Carteighe, of the Pharmaceutical Society of Great Britain, and Herr Anton Schürer von Waldheim, of Vienna.

In reference to the question of public sanitation and the prevention of the adulteration of food and drugs, the Congress

"*Resolved*, That in the judgment of this Congress the educated pharmacist is a natural and proper expert for measures of public health, not only in the prevention of adulterations, but in the inspection of water supplies, the enforcement of good sewage, etc. The pharmacist is, by virtue of his profession, the common chemist of the common people."

A Committee was also appointed to devise ways and means to secure proper legislation for the prevention of the adulteration of food and drugs in countries which may not already have such laws, this Committee to report to the Eighth International Pharmaceutical Congress.

Finally an Executive Committee was created which was charged with the duty of preparing for publication the proceedings of the Seventh, and the fixing of the time and place for the holding of the Eighth International Pharmaceutical Congress. The Executive Committee is composed of the President and Secretary of the Congress, together with Prof. Albert B. Prescott, of Ann Arbor, Mich.; Mr. Michael Carteighe, of London, and M. Emile Ramlot, of Brussels.

It will be recalled that an appropriation was made by this Association for the necessary preparations made for the meeting of the Seventh International Pharmaceutical Congress, and your Treasurer has reported the expenditures from that appropriation, which expenditures were, in accordance with the order of the Association, made under the immediate direction of the Council.

Your Committee would recommend that the question of publishing the proceedings of the Congress be referred to the Council of the Association with power to act.

It is finally recommended that your Committee, having now completed its labors, be discharged.

Very respectfully, OSCAR OLDBERG, *Chairman.*

ALBERT E. EBERT, *Secretary.*

Mr. Hallberg then presented the following addition to Section 3 of the report of the Committee on Revision of the United States Pharmacopœia:

Your Committee on the Revision of the United States Pharmacopœia requests the various State Associations to obtain collective reports on statistics of prescriptions in use in the various States, and to present such reports in tabulated form (furnished by the Committee) to the Committee on Revision of the Pharmacopœia of the American Pharmaceutical Association.

THE PRESIDENT: You have heard the resolution as presented by Prof. Hallberg, which I understand is to be substituted for Section 3 of the original report. It is not a motion in relation to it. The original Section reads as follows:

(The third Section was then read.)

MR. HALLBERG: I think it would be best to have this added to the original resolution.

THE PRESIDENT: The question before the house is the adoption of Section 3 as amended by this resolution. With your permission, I would divide this Section, and I will ask you to act upon the recommendation comprised in the first part, which is; "We suggest that the American Pharmaceutical Association urge the Committee of Revision of the United States Pharmacopœia to obtain reports from different sections of each State and Territory."

The question being on the motion to adopt the first part as just read, it was agreed to, and was adopted.

THE PRESIDENT: Now the second part: "The Committee on Revision of the United States Pharmacopœia of the American Pharmaceutical Association requests the various Associations to obtain collective reports on prescriptions in use in the various States, and to present such reports in a tabulated form furnished by this Committee to the Committee on Revision of the United States Pharmacopœia of the American Pharmaceutical Association." What is your pleasure in relation to this section? As many as are in favor—

PROF. GOOD: I want requests sent out from this Association for returns to be sent to that Committee.

THE PRESIDENT: That is understood. (The President then read it again.)

MR. MAIN: As I understand it, this Association is to be put to an expense.

THE PRESIDENT: It is, if you adopt this section.

MR. THOMPSON: I move that the motion just read be placed on the table.

The question being on Mr. Thompson's motion, it was agreed to.

THE PRESIDENT: The question now is upon the adoption of this report as a whole. It has been received and acted upon section by section, and the report is now to be adopted as a whole.

The question being on the adoption as a whole, it was agreed to, and the report adopted.

MR. SHEPPARD: There is one item of routine business that can be taken care of now, and that is to take action on the amendment of the By-Laws referred by the Council. It seems to be unnecessary to read them all; they are merely intended to incorporate in our By-Laws the new Committee appointed last year and to change the phraseology, and such like. It is hardly worth while to read them or discuss them.

It was then moved and seconded, that the By-laws referred to the Association by the Council be adopted. Agreed to.

THE PRESIDENT: There is an amendment to the Constitution.

MR. SHEPPARD: It is a provision recommended by the Council for adoption, referring simply to Council, the election of local Secretaries.

On motion, this was adopted.

MR. HALLBERG: I have a resolution in the hands of the Secretary, and would like to have permission to call it up. I think it will require no discussion whatever.

THE PRESIDENT: The resolution, which is not signed, comes from Prof. Hallberg:

Resolved, That a committee of three be appointed to submit the Constitution and By-laws of this Association to a thorough revision, and to report a draft of such conditions, changes, and corrections to the Association at its meeting next year.

This motion was seconded by several.

MR. THOMPSON: I do not believe that is a good plan to pursue. I think it much better to make fewer changes in the Constitution, and to make them as the necessity for them arises and experience points out. If we appoint a committee to revise the laws, you will hear a good many changes in the Constitution.

MR. SHEPPARD: I think it is a capital idea to allow these things to come from the Council, and to have them look them over in detail.

MR. THOMPSON: Let us make them when needed.

MR. HALLBERG: In reference to this Constitution, I have found thirty or forty articles which are never lived up to, and which are certainly out of place, and a great many grammatical errors; there are so many places in it that require changing, we will never in the world get at it unless some method of this kind is pursued. I have a copy here marked in blue—

MR. THOMPSON: That has always been the case.

MR. HALLBERG: I can show dozens of places, some of them in one Section being contradicted in another, and I do not believe you will ever get that rectified, unless you have a committee carefully go over this whole subject and report next year—they could report to the Council, if necessary.

MR. SHEPPARD: I hope Prof. Hallberg will amend his motion so that the committee be a committee of one, and I would like the Chair to select Prof. Hallberg.

MR. HALLBERG: Article III, Chapter 3, says: "The President and Vice-President shall be ex-officio members"—that says Vice-President in the singular, it does not say Vice-Presidents—the three shall be ex-officio members of Council. Now there are any number of errors of that kind, and we don't know what we are operating under half the time.

MR. THOMPSON: If Mr. Hallberg will amend his motion so as to have it refer to grammatical errors only—

THE PRESIDENT: The motion as I understand it as presented by Prof. Hallberg reads as follows:

Resolved, That a committee of one be appointed by the Chair to subject the Constitution and By-Laws to a thorough revision, and report such additions and changes to the Council for correction.

The question being on the motion of Prof. Hallberg, it was agreed to.

THE PRESIDENT: Members will please bear in mind that when we do adjourn, we adjourn to meet at a definite time fixed in our programme, which is nine o'clock Saturday morning. We should remember that many of us are obliged to go at two o'clock, and we should meet promptly if we are to get through and get our dinner and get the train I call attention to this, so it will not be overlooked.

MR. FENNEL: I want to introduce a resolution. In the discussion on the Report on the Progress of Pharmacy we ascertained certain literature which is the property of this Association, as I understand it. This literature, which is a valuable one, is in Philadelphia at present—that is, in charge of the Permanent Secretary—and members of this Association have liberty to look at these books and use them, but they must be used in the building. Now I want to offer a resolution that a committee of three be appointed to draft some resolutions or laws governing the use of these books, to take them out in all parts of the United States by members of this Association.

THE PRESIDENT: Is this resolution of Prof. Fennel seconded that a committee of three be appointed to draft resolutions governing the care of the publications or books in the possession of the Association?

MR. ALPERS: I second the motion.

The question being on the motion of Prof. Fennel, it was agreed to.

THE PRESIDENT: How shall that committee be appointed?

PROF. GOOD: By the Chair.

THE PRESIDENT: The Chair will reserve the appointment of the committee until a later day, but will appoint Prof. Hallberg a committee of one to consider the Constitution and By-laws. Is there any other business that should come before us at this time? If not, a motion to adjourn is in order.

Upon motion of Mr. Ebert, the Association then adjourned.

THIRD SESSION—TUESDAY AFTERNOON, SEPTEMBER 4.

The Association met at 3:45 p. m., with President Patch in the chair. The minutes of the previous session were read and approved, after which the meeting adjourned to give way to the Section on Commercial Interests.

FOURTH SESSION—WEDNESDAY MORNING, SEPTEMBER 5.

The meeting was called to order by President Patch at 10:25 a. m. Mr. Kennedy announced that no objection had been filed against any of the forty-seven persons proposed for membership whose names had been posted in the hall yesterday, and he, therefore, moved that the gentlemen be invited to become members. The motion was seconded and agreed to.

The Secretary of the Council then read the names of seventeen persons proposed for membership which had been approved and recommended by Council. Under the rule the names were directed to be posted for inspection.

No other business having been presented, the Association, upon motion, adjourned to enable the Section on Commercial Interests to hold its second session.

FIFTH SESSION—WEDNESDAY EVENING, SEPTEMBER 5.

The Association did not transact any business previous to the first meeting of the Section on Scientific Papers, on account of the lateness of the hour of assembling, at 8:45 p. m.

SIXTH SESSION—THURSDAY MORNING, SEPTEMBER 6.

President Patch called the Association to order at 10 a. m. The minutes of the third and fourth sessions were read and approved.

Mr. Kennedy moved that the seventeen gentlemen whose names had been posted yesterday be invited to become members, no objection having been made against any of them. The motion was agreed to.

The Secretary of the Council presented nine new names for membership, recommended by Council, and was directed to post them for inspection.

Upon motion, the meeting was adjourned to give way for the second session of the Section on Scientific Papers.

SEVENTH SESSION—THURSDAY AFTERNOON, SEPTEMBER 6.

The meeting was called to order by President Patch at 3:30 p. m. The Secretary read the minutes of the previous session, which were, upon motion, approved.

The Secretary of the Council, Mr. Kennedy, read the names of nine persons proposed for membership, to be posted in the hall, and moved that the nine gentlemen whose names had been presented yesterday, be invited to become members. The motion was agreed to.

The Association then adjourned to allow the Section on Scientific Papers to hold its third session.

EIGHTH SESSION—FRIDAY MORNING, SEPTEMBER 7.

No business was transacted by the Association preceding the first session of the Section on Legislation and Education.

NINTH SESSION—FRIDAY EVENING, SEPTEMBER 7.

On account of the lateness of the hour and the large volume of business to be brought before the Section on Legislation and Education, the Association did not transact any business.

TENTH SESSION—SATURDAY MORNING, SEPTEMBER 8.

The Association met at 10 a. m. and was called to order by President Patch. The Secretary read the minutes of the seventh session, which were approved.

Mr. Kennedy moved that the nine gentlemen whose names had been posted on Thursday be invited to become members. The motion was adopted.

The Secretary of the Council then read the minutes of the Council, which were, upon motion, approved. The reading of the minutes disclosed the following items of business:

SIXTH SESSION OF COUNCIL—SEPTEMBER 5, 1894.

Chas. M. Ford nominated Edmund L. Scholtz for Local Secretary for the coming year. There being no other nominations, he was unanimously elected.

The newly elected Permanent Secretary, Chas. Caspari. Jr., asked for instructions regarding the transfer of the property of the Association, now in possession of the late Permanent Secretary, J. P. Remington, and also asked for the destruction of some of the worthless property.

Leo Eliel moved, which was seconded by Chas. E. Dohme, that a committee of three, consisting of Chas. Caspari, Jr. and J. P. Remington, and one other whom they may select, be appointed, with full power to make an inventory of such property of the Association as they find to be of value, and to destroy such as they deem worthless, which was agreed to.

First Session of the New Council—September 5, 1894.

The new Council was organized by the election of Wm. S. Thompson, of Washington, D. C., as Chairman; H. M. Whitney, of Massachusetts, as Vice-Chairman; and G. W. Kennedy, of Pennsylvania, as Secretary.

On motion of S. P. Watson, it was agreed to dispense with the publication of the unbound pamphlets of the Proceedings, that have been issued the past two or three years, also that the Committee on Publication be urged to use every possible effort to issue the bound volume of the Proceedings at an early date.

The following Standing Committees were appointed:

Committee on Membership: H. M. Whelpley, Chairman; Chas. M. Ford, Geo. W, Voss, Wm. C. Alpers, S. P. Watson, Geo. W. Kennedy, Secretary.

Committee on Finance: Chas. E. Dohme, Chairman; Gus. Ramsperger, Jos. E. Morrison.

Committee on Centennial Fund: Wm. Simpson, Chas. E. Dohme, Chas. Caspari, Jr.

Publication Committee: C. Lewis Diehl, Chairman; Henry Kraemer, Jno. N. Hurty, Chas. Caspari, Jr., Edm. L. Scholtz.

Auditing Committee: Chas. E. Dohme, Chairman; David M. R. Culbreth. (Third member to be named later.)

Committee on Transportation: Chas. M. Ford, Denver, Col., Chairman; Caswell A. Mayo, New York City; Harry Sharp, Atlanta, Ga.; S. A. D. Sheppard, Boston, Mass.; A. E. Ebert, Chicago, Ill.; Wm. J. M. Gordon, Cincinnati, O.; L. F. Chalin, New Orleans, La.; H. M. Whelpley, St. Louis, Mo.; Wm. M. Searby, San Francisco, Cal.

Second Session of the New Council—September 6, 1894.

S. A. D. Sheppard offered the following changes to By-Laws:

Amend Chap. IX., Art. V., by striking out, in the first line, the words, "and fourth sessions," and insert the word "session" in place thereof.

Amend Chap. IX., Art. VI., by striking out, in the first line, the words, "fifth, sixth and seventh," and insert the words, "fourth, fifth and sixth," in place thereof.

Amend Chap. IX., Art. VII., by inserting the word "seventh" after the words, "At the," in the first line.

Third Session of the New Council—September 6, 1894.

Chairman Thompson stated that this meeting was called for the purpose of taking such action as may be deemed necessary to provide for the publication of the proceedings of the Seventh International Pharmaceutical Congress. He called upon Prof. Oscar Oldberg, who was Chairman of the Committee on the said Congress, to inform the Council as to the status of the question. Prof. Oldberg reminded the Council that the American Pharmaceutical Association had committed itself, and morally obligated itself to publish the proceedings of the Congress and to defray the expenses thereof; he also stated that the cost would probably not exceed $700, and might be considerably less.

Wm. C. Alpers presented the following resolution, which was adopted:

Resolved, That the balance of the appropriation of $1,000.00 in favor of the International Pharmaceutical Congress, being about $340.00, be used to publish the proceedings of the International Pharmaceutical Congress; and,

Resolved, That the American Pharmaceutical Association grant no further appropriation for this purpose.

S. A. D. Sheppard moved that the actual transactions of the Congress, such as votes passed and resolutions adopted, touching important general principles, be published in German, French, and Spanish, as well as English, but that the Minutes of the Congress be printed in English only. This motion was seconded and adopted.

H. M. Whitney moved that a special committee on the publication of the proceedings of the Congress, consisting of J. P. Remington, S. A. D. Sheppard and Oscar Oldberg, be appointed and charged with the duty of supervising the expenditure of the money applied for the said publication and to distribute the volumes, which was carried.

Charles Caspari, Jr., presented the following resolution, which was seconded by H. M. Whelpley and adopted by a rising vote.

Resolved, That the Council hereby tender to Prof. Jos. P. Remington their sincere appreciation of the careful and thorough manner in which he has performed the duties of the office of Secretary *ad interim.* The transfer of the office without an opportunity of consulting the late Prof. Maisch as to facts and methods, carried with it a vast amount of intricate work and labor, which has been most satisfactorily executed by Prof. Remington. New methods have been introduced and improvements suggested which will, no doubt, contribute materially to the expedition of work hereafter coming into the hands of the Permanent Secretary.

The Council of the American Pharmaceutical Association therefore desires to place on record its sense of gratitude to Prof. Remington for his valuable services.

FIFTH SESSION OF THE NEW COUNCIL—SEPTEMBER 8, 1894.

On motion of H. M. Whitney, it was agreed that the Permanent Secretary be authorized to procure such bars as in his judgment the demand warrants.

Chas. Caspari, Jr., stated that the retiring Permanent Secretary and the Permanent Secretary elect had agreed on the third person to compose the Committee to make an inventory of the property of the Association now in possession of Jos. P. Remington prior to its transfer, and destroy such worthless property as may be decided upon. He named Geo. W. Kennedy, Secretary of the Council.

On motion of H. Kraemer, the action of the Secretaries was approved.

The report of the Committee on Centennial Fund was then read as follows, and upon motion approved:

Your Committee beg leave to report that the sum of fifty dollars was appropriated upon the application of Prof. Edward Kremers, of Madison, Wis.

Respectfully,
E. L. PATCH,
CHARLES E. DOHME.
Committee.

Mr. Mayo then read the report of the Committee on Transportation, which was adopted.

REPORT OF THE COMMITTEE ON TRANSPORTATION.

Your Committee after much correspondence and numerous personal interviews with the various traffic associations, secured a rate of one-and-a-third fares from all the commissioners in the United States, except the Western Passenger Association. This exception is all the more notable, since that Association is one of the most liberal to all except druggists who apply for rates.

The Committee, as usual, sent out notices of the rates and routes, with the aid of the various railways interested.

One of the most serious drawbacks to the acceptance of the regular convention rate of one and a third fares lies in the time limit imposed. On these convention tickets the stay of the members at the place of meeting is limited to three days after the adjournment of the Association. The Committee therefore recommends that the meetings be so arranged as to at least nominally cover say two weeks. This need have no practical bearing on the business, scientific or social programme of the meeting, which would be laid out, as now, to cover five or six days; but when this programme was completed, adjournment could be had, not until the following year, but until the following week, or, possibly, from day to day, until the close of the second week. These might be called special sessions, and have no power to act for the Association. There would be no formal meetings during the second week, but such members as chose to stay over could merely meet and adjourn, so as to fulfill the formal requirements of the case.

The Committee will endeavor to arrange for transfer of tickets between members who, having come by one route, wish to return by another. To this end a memorandum book has been left at the office of the local secretary, in which members may enter any requests which they may have to prefer, giving details as to the routes over which they have tickets and as to those over which they wish to procure them. These entries will be taken note of by the Committee, and every effort made to effect such exchanges as may be mutually desirable.

The Committee would state, in conclusion, that some delay arose in perfecting its arrangements, from the fact that the former chairman, Mr. Thos. F. Main, finding it impossible to spare the necessary time to the performance of the duties of chairman, tendered his resignation, whereupon a new chairman was appointed.

CASWELL A. MAYO, *Chairman.*

The special committee to whom was referred the report of the Committee on National Formulary, submitted the following report, which was read by the Chairman, Prof. Good, and upon motion was accepted and adopted :

To the American Pharmaceutical Association :

Your Committee to whom was referred the report of the Committee on National Formuary beg leave to submit the following:

That they have carefully considered the various recommendations contained therein, and that they unite in endorsing them all for the approval of the Association.

The necessity for the changes proposed has been brought about partly because of the revision of the Pharmacopœia and partly because of the experience which has shown us better methods or pointed out defects in the formulæ. The proposed changes in one formula only we have thought advisable to bring to the notice of the Association, that for the elixir of quinine, iron and strychnine. The present elixir contains of the active ingredients, quinine 1 grain, iron 2 grains, and strychnine $\frac{1}{128}$ grain to a fluidram; if the changes be made it will contain quinine $\frac{1}{2}$ grain, iron 1 grain, strychnine $\frac{1}{64}$ grain to the fluidram, thus corresponding in strength with proprietary elixirs of the same name which are on the market. The Committee desires that you shall not ignorantly vote to double the amount of strychnine in the formula.

We agree with the National Formulary Committee that proper effort should be made to popularize the work. To prepare an epitome of it which should be sold at but little above its actual cost, would be one of the efficient means of doing this. We approve of continuing the work as at present, and recommend that the corrections made by the Committee shall be final.

J. M. GOOD,
WILLIAM C. ALPERS,
E. A. CORNELL.

Prof. Good, as chairman, also read the two following reports of the committee to whom were referred the communication and resolution of the American Medical Association. On motion, these reports were adopted.

In response to the resolution sent from the American Medical Association we offer the following :

Resolved, That the American Pharmaceutical Association condemns the prescribing and dispensing of proprietary medicines; and while the necessity of protecting capital invested in the manufacture and marketing of galenical preparations is recognized, we protest against any system of protection which permits one manufacturer to retain the exclusive control of a pharmaceutical product indefinitely, and regard the law which permits it as opposed to true progress in pharmacy and medicine.

Resolved, That the working formula of every pharmaceutical preparation should be published, and a technically correct scientific name given it, so that it may appear in professional literature, find a place in the Pharmacopœia or National Formulary, and be free to all pharmacists to manufacture and sell.

Resolved, That physicians be particularly requested to consult the United States Pharmacopœia and National Formulary in prescribing galenical preparations, and that we request both of these works be made text books in the medical colleges.

J. M. Good,
William C. Alpers.

Your Committee to whom was referred an abstract of a paper read at the last meeting of the American Medical Association held in San Francisco, entitled: "State Medicine; Its Relation to Patent Medicines," recommend that we express a desire to co-operate with other Associations in the matter, and that a delegate be sent to the next meeting of the American Public Health Association, to be held in Montreal the 24th inst., at which Convention it is understood the evils complained of will receive attention, it being understood that this delegate's duties are limited to those of a consultant only, any responsible action to be authorized by the Association or the Council.

J. M. Good,
William C. Alpers.

The President, having called Vice-President Caspari to the chair, Mr. Main submitted the following report from the committee, to whom had been referred the suggestions contained in the President's address. The report was received and adopted.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Your committee, to which was referred the President's address, after careful consideration, respectfully recommend the adoption of the following suggestions contained therein :

1. The recommendation "that this Association publish an 'observation sheet' for the purpose of recording difficulties in practice, etc., the same when filled to be forwarded to Chairman of Scientific Section for comment and presentation to the next meeting of the Association;" and your committee further recommend that the Chairman of the Scientific Section be authorized to have 5,000, or such number of copies of this observation sheet printed as may seem to him necessary to carry out this resolution.

2. The recommendation that the Sections on Education and Legislation and on Scientific Papers present to the Association an outline of a course of instruction on Pharmacy, such as in their estimation it would be desirable for teaching colleges to conform to, as far as practicable; and your Committee suggest that the Sections be requested to prepare this "outline" for presentation to the next meeting of the Association.

The suggestion of your President in relation to taking steps towards securing a National Pharmacy Commission and a National Pharmacy Law, is not recommended by your

Committee for adoption, for the reason that while a National Law regulating the practice of Pharmacy would be as desirable as a National Law regulating the practice of Medicine or a National Bankruptcy Law, the widely varying conditions of Pharmacy in the several States are such as at the present time would preclude the possibility of the passage of a measure that would be satisfactory to the pharmacists of all sections.

In reference to the recommendation of your President that the Association establish a scholarship fund of fifteen hundred dollars annually, for the purpose of securing higher education in Pharmacy to suitable candidates, your Committee, while in full sympathy with the spirit that prompted the recommendation, and appreciating the high ideal of Pharmacy calling it forth, believe that irrespective of other considerations, the financial condition of our Association will not warrant its assuming the responsibility that the establishment of such a scholarship would involve, and, therefore, cannot recommend its adoption.

Respectfully submitted,
THOS. F. MAIN,
WM. SIMPSON,
Committee.

MR. WHITNEY asked the indulgence of the Convention upon a matter which should have come before the Section on Commercial Interests, but it was not possible to present it to that Section:

Whereas, In the past few years several manufacturing pharmacists have voluntarily made it a specialty to supply physicians with ready-made material; and,

Whereas, Such a practice is highly detrimental to the advancement of the science of medicine, as well as the commercial interests of dispensing pharmacists and druggists; therefore, be it

Resolved, That the American Pharmaceutical Association condemns such practice, and recommends and advocates the withdrawal of patronage from all firms engaged in furnishing physicians direct with their manufactured products.

MR. RYAN: I would like to second that resolution, and in seconding it I would like to say a few words.

There is no question in my mind whatever but that the difficulty surrounding the drug business at the present time has been transferred from the patent medicine question to this very question that Mr. Whitney brings up. I believe that too little attention has been given to this matter by this Association. It is very much more important that they should have considered this question in the Commercial Section than to have spent the time they did on patent medicine. I do not believe that druggists in this country are aware of the extent to which this thing has grown in the past two or three years. If you go into our most eastern cities you will find that a majority—a majority I say—of the physicians of those cities are dispensing to a greater or less extent their own remedies. Not long since I visited a city in Connecticut, and out of one hundred physicians in that city, who were reputable, or considered reputable, there were not ten of those physicians but what dispensed their own remedies to a greater or less extent. In another city I know where several physicians having a practice of $2000 a year were dispensing their remedies from their own offices. In another city we have the example of a prominent teacher and instructor on therapeutics, who in his lecture pulpit gets up and defends the dispensing by the physicians, and he teaches the students to do it—says it is the only true way.

Now, gentlemen, I insist that this Association should take some action in regard to this matter of these firms who go and supply them direct. Why? Because they have representatives who are instructed to say to the doctors, Doctor, you must dispense your own remedies and protect yourself and protect your patient. Why must you do it? Because druggists are counter-prescribing and using recognized prescriptions and substitutes, and you never know what you are getting, and it is your duty to your patient and to yourself to dispense your own remedies.

The argument is a very catching one with a young physician, and he grabs it as the fish would grab the bait. He says, "Yes, it is so." Then what do they do? They go right straight round the corner to the druggist and try to get him to buy after they have gone and knifed him in the back. I hope this resolution will pass, and I hope in the future this Association will take cognizance of this matter to a greater extent than they have heretofore.

The question being on the motion of Mr. Whitney, seconded by Mr. Ryan, it was adopted.

Mr. Sheppard then offered the following resolution, which was adopted:

WHEREAS, It is very plain to all that much valuable time is lost in our annual meeting by what may be termed the chronic bad habit of delay in getting together at the various sessions;

Reesolved, That it is the sense of this meeting that in future proceedings the officers should call the meeting to order promptly at the time appointed. If a quorum is not present, urgent measures should be adopted to secure a quorum, and thus facilitate business.

The reading of communications being next in order, the President announced that he had recently received a letter from the Society of Belgian Chemists, unfortunately too late to take action thereon, but that a reply had been promptly forwarded.

The communication and reply were then read, and upon motion of Mr. Payne, the President's action was endorsed.

[ORIGINAL.]

Association Belge des Chimistes.

BRUXELLES, le 1er juin 1894.

MONSIEUR LE PRÉSIDENT: Les contributions apportées chaque jour aux connaissances que nous possédons sur la chimie sucrière, la chimie agricole, les falsification des denrées alimentaires, la technique, la morphologie et la physiologie des champignons et des bactéries doués du caractére ferment sont publiées par des journaux scientifiques bien divers.

Des mémoires importants sur ces sujects sont en effet éparpillés dans des revues de chimie, d' hygiéne, de médecine, de pharmacie, de botanique, de bactériologie, d' agriculture, de brasserie, distillerie, sucrerie, etc. . . .

Il en résulte que plusieurs publications intéressantes devienneut inaccessibles à beaucoup de spécialistes.

Certains de ces travaux paraissent même dans des comptes-rendus de sociétés scientifiques et industrielles, qui ne sont tirés qu'à un nombre très restreint d' exemplaires.

Quelques rares annuaires donnent bien un résumé des mémoires publiés sur ces matières dans les principales langues du monde; malheureusement à cause de l'extrême diffusion des articles que les auteurs de ces périodiques annuels doivent condenser, ces œuvres sont toujours incomplètes et ne paraissent qu' à des époques tres tardives.

Lors du Congrès de Chimie appliquée qui s'ouvrira à Bruxelles, le 4 août 1894, le Comité central de l'Ascociation Belge des Chimistes proposera aux Sociétés et Revues scientifiques représentées, un ensemble de mesures destinées à faciliter aux spécialistes et techniciens, l'accès rapide de toutes les publications qui les intéressent. Cette question mise d'abord à l'ordre du jour des travaux de la section de Chimie biologique a été étendue par le Comité central, dans sa séance du 24 avril dernier, à toute la société.

Les mesures que proposeront les rapporteurs de la question devant être discutées et ratifiées par les sociétés et revues compétentes, nous vous prions Monsieur, d'inviter votre Société à se faire représenter à notre Congrés par un ou plusieurs délègués ou a adherer d'avance aux décisions qui seront votées par les sociétés et journaux représentés.

Espérant que vous voudrez bien vous associer à notre œuvre, nous vous prions d'agréer Monsieur le Président, l'assurance de notre considération distinguée.

Au nom du comité d'organization du Congrès International de Chimie Appliquée:

Les Secrétaires généraux,	Le Président,	Le Vice-Présidents,
F. Sachs,	E. Hanuise,	G. Bruylants,
H. Van Laer.		D. Crispo.

[Translation.]

Mr. President: The contributions added each day to the knowledge which we possess of sugar chemistry, agricultural chemistry, the adulteration of alimentary products, the technology, morphology and the physiology of the fungi and the bacteria called "ferments" are published by many different scientific journals.

Important papers on these subjects are indeed published in the chemistry reviews and the reviews of hygiene, medicine, pharmacy, botany, bacteriology, agriculture, brewing, distilling, sugar-making, etc.

It happens that many interesting publications become inaccessible to a great many specialists.

Certain of these works also appear in the proceedings of scientific and industrial societies, which are printed only in very limited numbers.

Several rare annuals give very good summaries of the papers published on these matters in the principal languages of the world; unfortunately, on account of the extreme diffusion of the articles which the authors of these annual periodicals have to condense, these works are always incomplete, and appear only at very tardy dates.

At the time of the Congress of Applied Chemistry, which will open at Brussels the 4th day of August, 1894, the Central Committee of the Association of Belgian Chemists will propose to the societies and scientific reviews represented a list of measures designed to facilitate to specialists and technicists the rapid access of all publications which interest them. This question, placed at first in order of the day of the work for the Section of Biological Chemistry, has been extended by the Central Committee in its meeting of the 24th of last April to all the society.

The measures which the judges of the question will propose, needing to be discussed and ratified by the societies and competent reviews, we ask you, sir, to invite your Society to be represented at our Congress by one or several delegates, or to adhere moreover beforehand to the decisions which will be arrived at by the journals and societies represented.

Hoping you will be willing to associate yourself with our work, we pray you, Mr. President, to accept the assurance of our distinguished consideration.

In the name of the Committee of Organization of the International Congress of Applied Chemistry.

The General Secretaries:	The President:	The Vice-Presidents:
F. Sachs,	E. Hanuise.	G. Bruylants,
H. Van Leer.		D. Crispo.

[reply.]

Boston, *August* 3, 1894.

M. Sachs, *Sec. Internat. Congress oj Applied Chemistry.*

Respected Sir: Through some miscarriage, the circular and blank relating to the Internat. Congress of Applied Chemistry did not reach me in time to permit the appointment of a delegation to represent the American Pharmaceutical Association at your meeting called for August 4th.

The effort to collate all of real value relating to the various departments of chemical research that is annually presented in the scientific and technical journals of all countries, and the purpose to secure uniform methods of analysis and assay, should enlist the co-operation of all related societies.

Permit me in expressing my sincere regrets at our inability to send delegates or otherwise further the aims of your honorable associates and yourself, to wish for a very successful and enjoyable Congress.

Very respectfully,

EDGAR L. PATCH,

President of American Pharmaceutical Association.

A communication from the Committee on General Prizes was received stating that Messrs. Hallberg and Kraemer had resigned, owing to the fact that both gentlemen had presented papers to the Association at this meeting. The President appointed Messrs. Simon and Remington to fill the vacancies.

A communication from the Section on Legislation and Education was next read, recommending that the address of the Chairman be separately printed and circulated. After discussion of the question by Messrs. Hallberg, Fennel and Sheppard, the recommendation of the Section was not agreed to by the following vote—ayes 12, nays 20.

Another communication from the same Section was received relating to a resolution introduced by Mr. Payne, with regard to the recognition of Pharmacy in the U. S. army and navy.

The resolution was read as follows:

WHEREAS, The position of pharmacists as professional men is not properly recognized by the U. S. Government either in the navy or the army, therefore be it

Resolved, That the President of our Association appoint a committee consisting of one from each State in the Union, whose duty it shall be to secure through the pharmacists of his state the support of their Senators and Congressmen to a bill to be drawn by a subcommittee, said committee giving the pharmacists in the army and navy the same rank and pay as that of the assistant surgeons of these two branches of the public service.

After remarks by Messers. Remington and Whitney endorsing the resolution, the question being on the adoption of the recommendation, it was agreed to.

Dr. A. R. L. Dohme presented a resolution from the Section on Scientific Papers requesting a change in the By-laws so as to increase the number of sessions of that Section from three to four. The amendment was seconded and laid over until the next session.

The following resolution by H. M. Whelpley and seconded by Mr. Ebert was adopted:

"Moved that the Auxiliary Committee on Membership be continued with such changes in the personnel, as the President of this Association may deem advisable."

Mr. Ebert presented the following resolution, which was duly seconded and adopted:

"Moved, that permission be given by Council to publishers of dispensatories, commentaries, or text-books, pertaining to the United States Pharmacopœia, to insert the text of the National Formulary in their publications, with or without compensation, as the Council may determine."

The Association then adjourned to take a recess of ten minutes, and upon reassembling, Mr. Kennedy presented the name of one person proposed for membership, who, upon motion, was invited to join the Association.

A motion by Mr. C. E. Dohme, and seconded by Prof. Hallberg, was then adopted, that this Association unanimously expresses its thanks to the Chairman of the Citizens' Committee, Mayor Patton, to the Local Secretary, G. Whiteford Smith, the Secretary of the Local Committee, Mr. Rogers, to the proprietor of the Kenilworth Inn, Mr. Rhoads, to the manager of the Hot Springs Hotel, Dr. Kelly, and to the press and the citizens of Asheville for the kind interest which they have taken in their varied efforts to make our stay here in Asheville profitable, and that a copy of this resolution be sent to each of the parties named, by a committee appointed for that purpose.

The amendment of the By-laws in reference to the Commercial Section, reducing the number of sessions to one session, was carried by a vote of 30 to 21.

Mr. Sheppard moved that the following amendments be made in the By-laws, previous notice having been given of the change:

Amend Chapter 9, Article 5, by striking out in the first line the words, "and fourth session," and inserting the word "session" in place thereof.

Amend Chapter 9, Article 6, by striking out in the first line the words, "fifth, sixth and seventh," and inserting the words "fourth, fifth and sixth" in place thereof.

Amend Chapter 9, Article 7, by inserting the word "seventh," after the words "at the" in the first line.

The resolution presented by the Scientific Section, requesting a change in the By-Laws, so as to enable the Section hereafter to hold four sessions instead of three, was upon motion agreed to.

It was moved and seconded that the Local Secretary elected for the ensuing year be made Chairman of the Committee of Arrangements at Denver, with instruction to appoint his associates on that Committee.

This motion was carried.

The installation of officers being now in order, the Chair appointed Messrs. Gordon and Good to conduct the President-elect to the platform.

Mr. Whitney arose and, addressing the Chair, said:

As the possessor of the champion belt, I wish to acknowledge my defeat, and transfer the belt to the present local Secretary, Mr. Whitefoord G. Smith. I think he is entitled to it.

President Patch then addressed the President-elect as follows:

Mr. Simpson, permit me to congratulate you upon the high honor which this Association has bestowed in electing you to occupy the chair of the President for the ensuing year, and allow me to present to you this gavel as indicative of the fact that for a year at least you are to exercise dominion over your peers, and at the same time permit me to ornament you with this badge as an indication that you are to grace and ornament this office. I had thought that it would have been a very wise step for this Association to to have performed to have elected you at Chicago, that you might have presided over our sessions here in Asheville in your own home; but fate is very fickle, and for some reason in preparing for a good man of your size it was thought best to patch up the chair a little. (Applause).

Allow me to present to you the newly-elected President, Mr. Wm. Simpson, of Raleigh, N. C.

MR. SIMPSON replied: *Mr. President and Gentlemen:* The honor you have been pleased to confer upon me, is as unexpected as it is gratifying. To be elected President of the American Pharmaceutical Association, is an honor of which any man might justly feel proud. I feel that my powers are inadequate to properly express my thanks and the appreciation for the honor which you have done me. I feel that you intended to compliment the State and section which I have the honor in part to represent in thus conferring this honor upon me, and I thank you for this manifestation of confidence. (Applause).

MR. PATCH: The Committee will be kind enough to escort the First Vice President, C. M. Ford, of Denver, Col., to the platform.

THE PRESIDENT: *Ladies and Gentlemen and Members of the Association:* Permit me to present to you the newly-elected First Vice-President, the geographer of the Association—the man who at New Orleans made a map placing the White Mountains in his backyard and afterwards added Hot Springs, and then Chicago and Asheville, and finally Montreal, and when we reach Denver he expects to be presented with a copy of the finished publication. (Applause).

MR. FORD: *Mr. Chairman and Gentlemen:* It is hardly necessary for me to add anything to what has been said in such glowing terms of my ability as geographer, but I may have the promise of some ability as an officer of this Association. I believe and I understand the office I have been elected to fill is principally one of latent powers of executive office. Its experiences are generally filled with unrealized aspirations, especially when we look upon the very healthy subject we have elected as President. But in the event of such an unfortunate contingent falling upon the Association, I promise you that I will endeavor to fill the large chair.

THE PRESIDENT: Our Committee will be kind enough to conduct to the platform Prof. J. N. Hurty, of Indianapolis, as your Second Vice-President.

THE PRESIDENT: Permit me, ladies and gentlemen, to present to you Prof. J. N. Hurty, of Indianapolis, your Second Vice-President, who is probably better known to most of you than your present Chairman, and needs no further introduction.

J. N. HURTY: Had I known that a speech was expected I would have been twisting my gray matter for the last three or four days; but that I have not done, and I find myself much in the same position as the old minister in the village. A new minister coming to the little town where he was, appeared a very scholarly man, and very eloquent, and wrote all his sermons. The old minister who had served the people for many generations, said this writing of sermons was all wrong. The brother minister, the young man, though, soon called upon him, and paid him every attention, but the old gentleman was very tardy: but at last he called to pay his respects. Soon after he had arrived there he noticed a pile of manuscript upon the young man's table, and commenced upon him immediately, and told him: "I do not approve of this writing of sermons, sir." "Why?" says the young man. "Why, for the best reason in the world, sir. While you are writing sermons there, the devil can come up and look over your shoulder and read it, and see exactly what you are going to do, and he can come forth and thwart every one of your efforts. Now, when I speak, (he says), I never write a word, and I never think of what I am going to say, but I depend upon inspiration. When I enter the pulpit, I don't know what I am going to say, and even the devil himself don't know what I am going to say. (Laughter.) I am sensible, though, gentlemen, of the considerable honor that has been bestowed upon me. Still I find no difficulty in my mental processes in arriving at the conclusion that you have done very wisely. I would only say further that if I were ever called upon to address this Convention as an official, I should certainly take as my model that admirable address of Prof. Patch at the opening of this Convention (applause), that model of good English, clear, ripe, suggestive and conclusive; but, while I would take it as a model, I still would have it Hurty work and not patchwork. (Applause).

At the request of the Chair, the Committee next conducted Mr. Joseph E. Morrison to the platform, whom the President introduced as follows:

Ladies and Gentlemen: Allow me to present to you the Prophet of the Association, the man who can see only a little way off, but look out for what he tells you about the imaginary line that separates the Dominion of Canada and the glorious Old Republic. (Applause).

MR. MORRISON: *Mr. President and Ladies and Gentlemen:* I think your President has slightly misunderstood the prophecy: however, I do not wish to inflict a political speech upon you, but I simply beg to thank you for the very great and unexpected, and I will say undeserved honor which you have conferred upon me. I have been a member of this Association for some years past, but I have attended only two meetings; consequently I believe that although I have tried to do the best I could in my own part of the domain of pharmacy, still I am practically unknown to the membership of this Association. But I take the honor which has been conferred upon me, not as due to my personal worth, but as a recognition of our efforts in Canada to advance pharmacy; and as a representative of the Association of the Province of Quebec I beg to thank you heartily for the honor which you have conferred upon me. (Applause).

THE PRESIDENT: Will the Committee conduct the newly elected Permanent Secretary, Prof. Caspari, of Baltimore, to the platform?

THE PRESIDENT: Your newly elected and Permanent Secretary needs no introduction. (Applause).

MR. CASPARI: *Ladies and Gentlemen:* I am deeply sensible of the great responsibility you have placed upon my shoulders, and feel scarcely able to express my thoughts in fitting words. To be the party selected to fill the position so long occupied by the late Prof. Maisch, is an honor of which any member of the Association should feel proud, and I appreciate it highly. Prof. Maisch was so long in office, so thoroughly conversant with the duties of the office, and with the affairs of the Association, that every one had a right to expect from him full information upon any point connected with his work. This, of course, your newly elected Secretary will have to learn, and he will have to ask your forbearance on all his shortcomings in that line. I will promise, however, to do the work to the best of my ability and to give my best efforts to your service. I once more thank the membership for the honor conferred upon me. (Applause).

THE PRESIDENT: Will your Committee be kind enough to escort to the platform or present to the President our Treasurer, Mr. Sheppard?

THE PRESIDENT: Members of the American Pharmaceutical Association, allow me to present the newly elected Treasurer, S. A. D. Sheppard, of Boston. He possesses the faculty which some of us may possess, and which all of us have noticed, of one day feeling poor and another day feeling rich, as circumstances seem to point.

MR. SHEPPARD: *Mr. Chairman and Ladies and Gentlemen:* I thank you sincerely for this renewed expression of your confidence, and will not inflict any speech upon you, for I know that my work is simply that of the honest drudge. (Applause).

THE PRESIDENT: This finishes the installation of your officers, and before resigning my chair to the President-elect, permit me to perform the last official acts that you have instructed me to perform, namely, the appointment of a delegate to the American Public Health Association which meets at Montreal. to carry out the resolutions presented by Prof. Good from the Committee to which the matter had been referred. I will appoint Mr. Joseph E. Morrison, your newly elected Third Vice-President, and as your Committee to draft the resolutions of thanks which this meeting has instructed the Committee to draft, I will select Mr. C. E. Dohme, of Baltimore, Mr. Thompson, of Washington, and Mr. Baker, of Richmond. I also take this occasion to thank you, ladies and gentlemen, for your kind support and your faithful attendance, and ask you to extend to my successor all those courtesies that he will need in his course, if that is possible.

It was suggested that the Reporter on Progress of Pharmacy had been omitted.

PRESIDENT PATCH: You will excuse me: the Committee will conduct to the platform the Reporter on Progress of Pharmacy, that very important officer who has been overlooked.

THE PRESIDENT: Gentlemen, allow me to present to you your newly elected Reporter on the Progress of Pharmacy, and I am very glad that we have a man in that position who can stand up and speak for himself, and not let any member of the Association interfere in what he conscientiously believes to be his work in the line of duty. (Applause.)

MR. KRAEMER: *Mr. President and Gentlemen:* I certainly thank you for this honor again. I think you will find the Report upon the Progress of Pharmacy for 1893–94 an improvement upon the last one. I believe the following Report should be an improvement upon it, and I certainly thank you for your confidence in my ability, and in my judgment to do my work to the satisfaction of the members of the American Pharmaceutical Association. I thank you for the honor. (Applause.)

MR. THOMPSON: Mr. President, if in order, sir, I would move you that the thanks of this Association are hereby tendered to the retiring President for the very able and impartial manner in which he has discharged the duties of his office during the past year, and the thanks are also tendered to the retiring officers of the Association.

PRESIDENT SIMPSON IN THE CHAIR: Gentlemen, you have heard the motion of Mr. Thompson, that the thanks of this Association be extended to our retiring President and the other officers. Are you ready for the question?

The question being on the motion of Mr. Thompson, it prevailed unanimously.

PROFESSOR GOOD: Mr. President, there being no further business to come before the Association, I move that we now adjourn.

MR. SHEPPARD: I would say, it is necessary to read our minutes.

On motion, the reading of the Minutes was dispensed with.

Prof. Good then repeated his motion that the Association adjourn to meet in Denver in 1895, at such time as the Council may determine.

The motion having been duly seconded, was unanimously agreed to.

ALPHABETICAL LIST OF NAMES OF MEMBERS FROM WHOM MONEY HAS BEEN RECEIVED BY THE TREASURER FOR ANNUAL DUES OR CERTIFICATES, FROM JULY 1, 1893, TO JULY 1, 1894.

	Annual Dues.	Certificates.
Acker, Philip ’93	$5 00	
Ahlbrandt, Henry E. ’93	5 00	
Aimar, Charles P. ’93	5 00	
Alexander, Maurice W ’93	5 00	
Alfreds, Henry J. ’93–’94	10 00	
Allen, E. Floyd ’93	5 00	
Amend, Bernard G. ’93–’94	10 00	
Amend, Otto P. ’93–’94	10 00	
Anderson, James M. ’93	5 00	
Anderson, Samuel ’94	5 00	
Andrews, Josiah H. ’93	5 00	
Andriessen, Hugo ’94	5 00	
Angell, Richard ’93	5 00	
Apel, Frederick E. ’93	5 00	
Apple, Franklin M. ’93	5 00	
Argenti, Jerome J. B. ’93	5 00	
Armor, Alpheus ’93	5 00	
Armstrong, George R. ’93	5 00	
Arnold, Charles F. ’93–’94	10 00	
Arny, Harry V. ’94	5 00	
Arrington, Homer H. ’93	5 00	
Asplin, John H. ’93	5 00	
Atwood, Herman W. ’93	5 00	
Aubley, Samuel ’93	5 00	
Auf’mwasser, Hugo W. ’93	5 00	
Auf’mwasser, Julius H. ’93	5 00	
Avary, Moody B. ’93	5 00	
Ayer, Charles F. ’93	5 00	
Bailey, Frederick ’94	5 00	
Bain, Andrew W. ’91	5 00	
Baker, Edwin. ’94	5 00	
Baker, T. Roberts ’94	5 00	
Ball, Charles E. ’93–’94	10 00	
Ballard, John W. ’93	5 00	
Balser, Gustavus ’93–’94	10 00	
Baltzley, Zachariah T. ’93	5 00	
Baridon, Louis R. ’94	5 00	
Baril, Joseph B. ’93	5 00	$7 50
Bartells, George C. ’93	5 00	
Bartlett, John A. ’93	5 00	
Bartlett, N. Gray ’93	5 00	
Bartley, Elias H. ’93	5 00	
Bauer, Louis G. ’93	5 00	
Baur, Jacob ’93	5 00	
Baylis, Lewis F. ’94	5 00	
Bayly, Charles A. ’93	5 00	
Beach, Clifton H. ’93	5 00	
Beal, James H. ’94	5 00	
Beardmore, Wm. A. ’92–’93	10 00	
Bechberger, Henry ’93	5 00	
Bechmann, Charles R. ’93	5 00	
Becker, Charles L. ’93–’94	10 00	
Beckmann, Oscar A. ’93	5 00	
Beckwith, Edmund R. ’91	5 00	
Behrens, Emil C. L. ’93	5 00	
Behrens, Paul J. ’93	5 00	
Beitenman, William W. ’93–’94	10 00	
Bell, John I. ’93	5 00	
Bell, S. Howard ’94	5 00	
Bendiner, Samuel J. ’94	5 00	
Amount carried forward	$345 00	$7 50
Amount brought forward	$345 00	$7 50
Benfield, Charles W. ’93	5 00	
Beringer, George M. ’93	5 00	
Bernhard, Charles H. ’93	5 00	
Berryhilll, Henry P. ’94	5 00	
Best, John ’93	5 00	
Betz, Otto E. ’93	5 00	
Betzler, Jacob ’93	5 00	
Beyschlag, Charles ’94	5 00	
Biddle, Herbert G. ’94	5 00	
Billings, Henry M. ’93–’94	10 00	
Bingham, Charles C. ’93	5 00	
Binkley, George K. ’94	5 00	
Bird, Harry L. ’93	5 00	
Bishop, Francis M. ’93	5 00	
Bishop, Samuel E. ’93	5 00	
Black, John R. ’94	5 00	
Blackman, Augustus S. ’93	5 00	
Blair, Henry C. ’94	5 00	
Blake, James E. ’93–’94	10 00	
Blakely, George C. ’93	5 00	
Blank, Alois ’93	5 00	
Blestren, Hans M. G. ’93	5 00	
Blumauer, Louis ’93	5 00	
Bocking, Edmund ’93	5 00	
Bodemann, Wilhelm ’93	5 00	
Boerner, Emil L. ’93	5 00	
Boggs, Edwin L. ’93	5 00	
Boisvert, Pierre ’93	5 00	
Bond, John B. ’93	5 00	
Bondurant, Charles S. ’93	5 00	
Bowron, Walter H. ’93	5 00	
Boyce, Samuel F. ’93	5 00	
Boyd, George W. ’94	5 00	
Boyd, William P. ’93	5 00	
Boyden, Edward C. ’94	5 00	
Boyden, Henry D. ’93	5 00	7 50
Boynton, Herschell ’93–’94	10 00	
Brack, Charles E. ’93	5 00	
Brand, Erich ’93	5 00	
Braunwarth, Alice L. ’94	5 00	7 50
Breningstall, Reuben G. ’93	5 00	
Breslin, Michael T. ’93	5 00	
Brewer, John W. ’93	5 00	
Bridges, Charles H. ’93–’94	10 00	
Briggs, Andrew G. ’93–’94	10 00	
Bronson, George S. ’93	5 00	
Brooks, Claude M. ’93	5 00	
Brother, William ’94	5 00	
Brown, Henry J. ’93–’94	10 00	
Brown, William A. ’93	5 00	
Bruce, James ’93	5 00	
Bruck, Philip H. ’94	5 00	
Bruguier, Francis ’93	5 00	
Brundage, Albert H. ’93	5 00	
Brundage, Fred. ’93	5 00	
Buchheit, Aug. W. ’93	5 00	
Buck, John ’93	5 00	
Buck, John L. ’93	5 00	
Bunker, Elihu. ’93–’94	10 00	
Amount carried forward		$22 50

	Annual Dues.	Certificates.
Amount brought forward	$675 00	$22 50
Bunting, Lindsay ’93–’94	10 00	
Burg, John D. ’94	5 00	
Burge, James O. ’93	5 00	
Burkhardt, Mark A. ’92–’93	10 00	
Burnham, Alfred A., Jr. ’94	5 00	
Burnham, Edward S. ’93	5 00	
Burns, J. Kellar ’93	5 00	
Burrough, Horace ’94	5 00	
Butler, Charles H. ’94	5 00	
Butler, Freeman H. ’94	5 00	
Button, Charles E. ’94	5 00	
Calder, Albert L. ’93–’94	10 00	
Caldwell, James W. ’93	5 00	
Calvert, John ’93	5 00	
Candidus, Philip C. ’93	5 00	
Capper, William E. ’93	5 00	
Carrell, Eugene A. ’93	5 00	
Carrieré, Rodrique ’93	5 00	
Carslake, George M. ’94	5 00	
Cartledge, Edward C. ’93	5 00	
Carver, Frank H. ’94	5 00	
Case, Charles H. ’93	5 00	
Case, George D. ’93	5 00	
Caspari, Charles, Jr. ’94	5 00	
Casper, Thomas J. ’94	5 00	
Catlin, Ephron ’93	5 00	
Chalin, Louis F. ’93	5 00	
Chandler, Charles F. ’93–’94	10 00	
Chapin, Fred. H. ’93	5 00	
Chapin, William A. ’94	5 00	
Chapman, Isaac C. ’93–’94	10 00	
Charroppin, Emile L ’94	5 00	
Chears, Henry R. ’93	5 00	
Cheatham, Thomas A. ’93	5 00	
Christiani, Charles ’94	5 00	
Christie, James ’93	5 00	
Clark, John A. ’93	5 00	
Clark, Louis G. ’93	5 00	
Cobb, George W. ’93	5 00	
Cobb, Ralph L. ’94	5 00	
Coblentz, Virgil ’93	5 00	
Cohn, Richard ’93	5 00	
Cole, Howson W. ’94	5 00	
Colen, James A. ’93–’94	10 00	
Colgan, John ’93	5 00	
Collins, Albert B, ’94	5 00	
Colton, James B. ’93	5 00	
Commings, Charles S. ’91–’92	10 00	
Cone, John W. ’94	5 00	
Conrad, John ’93	5 00	
Conrath, Adam ’94	5 00	
Constantine, Edward R. ’93	5 00	
Cook, Gilbert S. ’94	5 00	
Cook, Thomas P. ’93	5 00	
Coon, James V. D. ’93	5 00	
Cornell, Edward A. ’93	5 00	
Cornell, Russell W. ’93	5 00	
Cotton, R. M. ’93	5 00	
Cowdin, George H. ’93	5 00	
Cox, John T. ’93	5 00	
Crady, Edward E. ’93	5 00	
Cramer, Max ’94	5 00	
Crawford, Walter B., Jr. ’94	5 00	
Criswell, Francis M. ’94	5 00	
Crolius, Frank M. ’93	5 00	
Croom, Jas. D. ’93	5 00	
Crosby, Charles M. ’93	5 00	
Crossman, George A. ’93	5 00	
Culbreth, David M. R. ’93	5 00	
Culver, Anson A. ’94	5 00	
Cummins, J. Wirt ’93	5 00	
Currier, Edward H. ’93	5 00	
Curtman, Charles O. ’93–’94	10 00	
Cushman, Henry C. ’93	5 00	
Cuthbert, Richard W. ’93	5 00	
Amount carried forward	$1090 00	$22 50

	Annual Dues.	Certificates.
Amount brought forward	$1090 00	$22 50
Cutts, Foxwell C., Jr. ’94	5 00	
Dadd, John A. ’94	5 00	
Daubauch, Charles J. ’93	5 00	
Davies, Llewellyn P. ’93–’94	10 00	
Davis, Edward H. ’94	5 00	
Davis, Eugene M. ’93	5 00	
Davis, George R. ’93	5 00	
Davis, Samuel C. ’93	5 00	
Davis, Theodore G. ’94	5 00	
Dawson, Edward S., Jr. ’93	5 00	
Dawson, John H. ’93	5 00	
De Armona, Joseph R. ’93	5 00	7 50
De Forest, William P. ’93	5 00	
De Graff, David ’93	5 00	
De Lang, Alfred ’93	5 00	
De Lorenzi, Albert ’93	5 00	
Dedrick, Wm. Fred. ’93	5 00	
Deibert, Thomas I. ’93	5 00	
Dejan, J. B. George ’94	5 00	
Dell, Wm. A. ’93	5 00	
Demond, Otto J. ’94	5 00	
Dennin, Charles ’93–’94	10 00	
Dennin, Edwin C. ’93–’94	10 00	
Deutsch, Julius W. ’93	5 00	
Devine, John ’93	5 00	
Dewoody, William L. ’94	5 00	
Diehl, C. Lewis ’93	5 00	
Dietrick, H. Dickson ’93	5 00	
Dilly, Oscar C. ’93	5 00	
Dimock, Robert H. ’94	5 00	
Ditman, Andrew J. ’93–’94	10 00	
Dixson, Frederick H. ’93	5 00	
Dodd, Simon W. ’93	5 00	
Dolan, Frank L. ’94	5 00	
Donaldson, Joseph C. ’93	5 00	
Donaldson, Pierre A. ’94	5 00	
Dorner, Emil A. ’94	5 00	
Dougherty, Samuel E. ’93	5 00	
Downing, Benjamin F. ’93	5 00	
Downing, Lucien B. ’94	5 00	
Drake, Charles W. ’94	5 00	
Drake, John R. ’94	5 00	
Dreher, Louis ’93	5 00	
Dresser, George E. ’93	5 00	
Driggs, Charles M. ’93	5 00	
Drury, John S. ’93	5 00	
Duble, Jesse B. ’93	5 00	
Dubois, William L. ’93	5 00	
Duckert, Louis A. ’93	5 00	
Dunn, John A. ’94	5 00	
Dupont, William. ’93	5 00	
Durban, Sebastian ’91–’92–’93	15 00	
Durkee, William C. ’94	5 00	
Dutcher, Alfred L. ’94	5 00	
Easterday, Herbert C. ’93	5 00	
Eberbach, Ottmar ’94	5 00	
Eberle, Charles L. ’93	5 00	
Eccles, Robert G. ’94	5 00	
Eckford, Joseph Wm. ’93	5 00	
Eddy, Henry C. ’93	5 00	
Edwards, Nathan W. ’93	5 00	
Edwards, Wm. F. ’93	5 00	
Egeling, B F. Gustavus ’93	5 00	
Eger, George ’93	5 00	
Eggers, Frederick H. ’93	5 00	
Ehrlicher, Henry M. ’93	5 00	
Eichberg, Julius Henry ’93	5 00	
Eimer, Charles ’93–’94	10 00	
Ekman, N. Adolf ’93	5 00	
Elbe, Constantine B. ’93	5 00	
Eliel, Leo ’93	5 00	
Elliott, Arthur H. ’93	5 00	
Elliott, Henry A. ’94	5 00	
Elliott, Sydney T. ’93	5 00	
Emanuel, Louis ’94	5 00	
Amount carried forward	$1500 00	$30 00

	Anuual Dues.	Certificates.
Amount brought forward	$1500 00	$30 00
Emich, Columbus V. '94	5 00	
England, Joseph W. '93	5 00	
Enterkine, James E. '93	5 00	
Ernst, Frank F. '93	5 00	
Eschman, Clemens L. '93	5 00	
Estabrook, Henry A. '94	5 00	
Estes, Joseph J. '93	5 00	
Evans, Joseph S. '94	5 00	
Ewing, John '93	5 00	7 50
Fairchild, Samuel W. '94	5 00	
Farlow, John B. '93	5 00	
Farrar, Samuel R. '93	5 00	
Fay, Hamilton '93	5 00	
Fechter, Arthur E. '93	5 00	
Feldkamp, Chas. L. '93	5 00	
Fennel, Charles T. P. '93-'94	10 00	
Fenner, Alexander W. '93-'94	10 00	
Ferguson, Andrew D. '93	5 00	
Fieber, Gustavus A. '93	5 00	
Fink, Frederick Wm. '93-'94	10 00	
Finlay, Alexander K. '93	5 00	
Finlay, Norval H. '92-'93	10 00	
Finley, Ardon C. '92-'93	10 00	
Firmin, John C. '93	5 00	
Fischer, Oscar F. '93	5 00	
Fish, Chas. F. '93	5 00	
Fish, Frederic W. '93	5 00	
Fisher, Elbert E. '93	5 00	
Fisher, George W. '93	5 00	5 00
Flanagan, Lewis C. '94	5 00	
Fleischmann, Augustus T. '93	5 00	
Flint, John H. '93	5 00	
Forsyth, William K. '93	5 00	
Fortier, Lawrence H. '93	5 00	
Foster, William O. '93	5 00	
Foulke, James '93-'94	10 00	
Fougue, Joseph '93	5 00	5 00
Fowler, Jos. W. '93	5 00	
Fox, Peter P. '93	5 00	
Fraisse, Louis A. '93	5 00	
Frames, J. Fuller '93	5 00	
Franklin, Philip H. '93	5 00	
Fraser, Horatio N. '93-'94	10 00	
French, Harry B. '94	5 00	
Frerksen, Richard C. '91-'92-'93	15 00	
Frohwein, Richard '93	5 00	
Frost, William A. '93	5 00	
Frye, George C. '94	5 00	
Gallagher, John C. '93	5 00	
Galt, Edward P. '93	5 00	
Gammon, Irving P. '93	5 00	
Gano, William H. '93	5 00	
Gardner, Robert W. '93-'94	10 00	
Gates, Howard E. '94	5 00	
Gayle, John W. '94	5 00	
Gayner, John N. '92-'93	10 00	
Gegelein, Frederick L. '94	5 00	
Gee, Charlie '93	5 00	7 50
Geier, Oscar W. '93	5 00	
Geisler, Joseph F. '93	5 00	
Gessner, Emil A. '94	5 00	
Gibson, James E. '93	5 00	
Gidday, Frederic C. '93	5 00	
Gilbert, Charles A. '93	5 00	
Gill, George '94	5 00	
Gillett, John '93	5 00	
Gilpin, Henry B. '94	5 00	
Girling, Robert N. '94	5 00	
Gleim, John C. '93	5 00	
Glines, George W. '94	5 00	
Glover, William H. '93	5 00	
Godding, John G. '94	5 00	
Good, James M. '93	5 00	
Goodale, Harvey G. '93	5 00	
Gooding, Charles J. '93	5 00	
Amount carried forward	$1930 00	$55 00

	Annual Dues.	Certificates.
Amount brought forward	$1930 00	$55 00
Goodwill '94	5 00	
Goodwin, Lester H. '93	5 00	
Gorgas, George A. '94	5 00	
Gorman, John T. B. '94	5 00	
Gosman, Adam J. '94	5 00	
Grambois, Augustin '93	5 00	
Grandjean, Charles '93	5 00	
Grandjean, Eugene '93	5 00	
Graner, Albert '92-'93	10 00	
Graner, William '93	5 00	
Grassly, Charles W. '93	5 00	
Gray, Henry R. '93	5 00	
Gray, William '93-'94	10 00	
Green, Benjamin '93	5 00	
Green, Hamer H. '94	5 00	
Green, Robert M. '93	5 00	
Greene, William R. '93-'94	10 00	
Gregory, Willis G. '93	5 00	
Greiner, William E. '94	5 00	
Greve, Charles M. '94	5 00	
Greve, Theodore L. A. '94	5 00	
Greyer, Julius '93	5 00	
Gross, Edward Z. '93-'94	10 00	
Grossklaus, John F. '94	5 00	
Grossman, Edward L. '93	5 00	
Gundrum, George '93	5 00	
Haake, William H. '93	5 00	
Hadley, Frank R. '93-'94	10 00	
Haenchen, Charles E. '93	5 00	
Haight, William B. '93-'94	10 00	
Hale, Chester S. '93	5 00	
Hall, Charles K. '93-'94	10 00	
Hall, Edwin B. '94	5 00	
Hall, Nettie C. '93	5 00	
Hall, William A. '93	5 00	
Hallberg, Carl S. N. '93	5 00	
Hamilton, Claude C. '93	5 00	
Hancock, John F. '92-'93	10 00	
Hancock, J. Henry '93-'94	10 00	
Hannan, Owen B. '93	5 00	
Hardigg, William L. '93	5 00	
Hardin, John H. '93	5 00	
Harding, Lawrence A. '93	5 00	
Hardy, Cyrus D. '93	5 00	
Harlow, Noah S. '93-'94	10 00	
Harper, Harry W. '92-'93	10 00	
Harrington, Frank '93	5 00	
Harris, William S. '93	5 00	7 50
Harrison, Jacob H. '93	5 00	
Hart, Gilbreath N. '93	5 00	
Harter, Isaac F. '93	5 00	
Hartnett, Eugene '93	5 00	
Hartshorn, Frederick A. '94	5 00	
Hartwig, Charles F. '93	5 00	
Hartwig, Otto J. '94	5 00	
Harvey, John M. '93	5 00	
Hassebrock, Henry F. '93	5 00	
Hassler, Alfred J. '93	5 00	
Hattan, Edgar M. '93-'94	10 00	
Hauenstein, William '93-'94	10 00	
Haussamann, Henry L. '93-94	10 00	
Hawkins, M. Smith '94	5 00	
Hay, Edward A. '94	5 00	
Hayes, Horace P. '94	5 00	
Hayes, James H. '93	5 00	
Haynes, David O. '94	5 00	
Hechler, George L. '93	5 00	
Heddens, Claus H. '93	5 00	5 00
Hedley, Thomas A. '93	5 00	
Hegeman, J. Niven '93-'94	10 00	
Heimstreet, Edward B. '94	5 00	
Heinemann, Otto '93	5 00	
Heinitsh, Sigmund W. '94	5 00	
Helke, William L. '94	5 00	
Hemm, Francis '93	5 00	
Amount carried forwarn	$2380 00	$67 50

	Annual Dues.	Certificates.
Amount brought forward	$2380 00	$57 50
Henderson, Archibald K. ’94	5 00	
Henry, Charles ’93	5 00	
Henry, Charles L. ’92–’93	10 00	
Herbst, Frederick W. ’94	5 00	
Hereth, Samuel F. ’93	5 00	
Hermann, John G. ’93	5 00	
Herring, Herbert L. ’93	5 00	
Hervey, James ’94	5 00	
Hess, Paul I. ’93	5 00	
Heydenreich, Emile ’93–’94	10 00	
Heyerdahl, Carl Otto ’93	5 00	
Higgins, James S. ’94	5 00	
Hilby, Francis M. ’93	5 00	
Hildreth, Newton G. ’93	5 00	
Hill, Justin L. ’93	5 00	
Hille, David J. ’93	5 00	5 00
Hilton, Samuel L. ’94	5 00	
Hiriat, Sebastian ’94	5 00	
Hitchcock, John E. ’93	5 00	
Hobbs, William ’93	5 00	
Hodgkins, Bert W. ’93	5 00	
Hoffmann, Frederick ’94	5 00	
Hogan, John J. ’93	5 00	
Hogan, Louis C. ’93	5 00	
Hogey, Julius H. ’93	5 00	
Hohly, Charles ’93	5 00	
Holland, Samuel S. ’93–’94	10 00	
Holmes, Clay W. ’94	5 00	
Holmes, Henry E. ’93	5 00	
Holzhauer, Gustavus ’93	5 00	
Homer, John ’93	5 00	
Hood, Charles I. ’94	5 00	
Hood, John W. ’93	5 00	
Horn, Wilbur F. ’93	5 00	
Horne, Henry R. ’93	5 00	
Houghton, Harry J. ’93	5 00	
Houser, Charles G. ’93	5 00	
Hubert, Ernest ’93	5 00	
Hudgins, Ernest F. ’93	5 00	5 00
Hudson, Arthur 93	5 00	
Huecker, John ’93	5 00	
Huhn, George ’93	5 00	
Hunt, Denis D. ’93	5 00	
Hunter, Buxton W. ’93	5 00	
Huntington, William H. ’94	5 00	
Hurd, John C. ’94	5 00	
Huston, Charles ’94	5 00	
Hutchins, Isaiah ’93	5 00	
Hutton, Harry D. ’94	5 00	
Hydren, Carl ’93	5 00	
Hyler, William H. ’93	5 00	
Hynson, Henry P. ’93	5 00	
Ihlefield, Conrad H. ’93	5 00	
Illsley, George W. B. ,93	5 00	
Ingalls, Albert O. ’93	5 00	
Ingalls, John ’93	5 00	
Ink, Charles E. ’93	5 00	
Irvin, William A. ’94	5 00	
James, Frank L. ’92	5 00	
James, William T. ’93	5 00	
Jamieson, Thomas N. ’93	5 00	
Jenkins, Luther L. ’94	5 00	
Jesson, Jacob ’93	5 00	
Joergensen, Sophus ’93–’94	10 00	
Johnson, Charles B. ’93–’94	10 00	
Johnson, Frank W. ’93	5 00	
Johnston, William, Jr. ’91–’92	10 00	
Jones, Alexander H. ’94	5 00	
Jones, James H. ’93	5 00	
Jones, James T. ’93	5 00	
Jones, John, Jr. ’94	5 00	
Jones, Simon N. ’93	5 00	
Jordan, Francis ’93	5 00	
Joy, Edwin W. ’93–’94	10 00	
Judisch, George ’93	5 00	
Amount carried forward	$2790 00	$77 50

	Annual Dues.	Certificates.
Amount brought forward	$2790 00	$77 50
Jungkind, John A. ’93	5 00	
Jungmann, Julius ’93	5 00	
Kaiser, Wm. O. ’93	5 00	
Kalish, Julius ’93–’94	10 00	
Karb, George J. ’94	5 00	
Kauffmann, George B. ’94	5 00	
Keefer, Chas. D. ’94	5 00	
Keene, Thomas R. ’93	5 00	
Keeney, Caleb R. ’93	5 00	
Keith, Irwin A. ’93	5 00	
Kelley, Edward S. ’94	5 00	
Kemp, Edward ’93–’94	10 00	
Kennedy, Ezra J. ’93	5 00	
Kenney, Herbert E. ’93–’94	10 00	
Kent, Henry A., Jr. ’93	5 00	
Keppler, Charles L. ’93	5 00	
Keppler, Christian L. ’93	5 00	
Kerr, Frank G. ’93	5 00	
Kerr, William W. ’93	5 00	
Kiedaisch, John F., Jr. ’93	5 00	
Kieffer, George ’93	5 00	
Kilbourne, Lewis P. ’93–’94	10 00	
Kilmer, Frederick B. ’93	5 00	
King, George A. N. ’93–’94	10 00	
Kinnear, James A. ’93	5 00	
Kirchgasser, Wm. C. ’94	5 00	
Kirchhofer, Paul ’93	5 00	
Kirkland, Derwentwater ’93	5 00	
Klayer, Louis ’93	5 00	
Klein, Frederick ’93	5 00	
Klie, G. H. Charles ’93	5 00	
Kline, Charles S. ’93	5 00	
Kline, Mahlon N. ’94	5 00	
Knabe, Gustavus A. ’93	5 00	
Knock, Thomas F. ’94	5 00	
Knoebel, Thomas ’94	5 00	
Knoefel, August ’93	5 00	
Koch, Louis ’94	5 00	
Kochan, John ’93	5 00	
Koehnken, Herman H. ’93	5 00	
Koenigstein, Daniel J. ’93	5 00	
Koles, Samuel M. ’93	5 00	
Kraemer, Henry ’93–’94	10 00	
Krebs, Carl ’93	5 00	
Krehe, J. Theodor ’93	5 00	
Kremers, Edward ’94	5 00	
Krewson, William E. ’93	5 00	
Krieger, Philip ’94	5 00	
Kuder, William F. ’93	5 00	
Kurfurst, Henry F. ’94	5 00	
La Pierre, Elie H. ’94	5 00	
La Rue, William I. ’94	5 00	
Lachance, Seraphin ’94	5 00	
Lahme, Charles A. ’93	5 00	
Laing, Alfred A. ’94	5 00	
Lalmant, Eugene ’93	5 00	
Lammert, C. Joseph ’93–’94	10 00	
Lampa, Robert R. ’93–94	10 00	
Lander, John C. ’93	5 00	
Lane, Edward B. ’93	5 00	
Last, Louis ’94	5 00	
Lawton, Charles H. ’93–’94	10 00	
Lawton, Horace A. ’93–’94	10 00	
Layton, Thomas ’93	5 00	
Leavitt, Miner L. H. ’93	5 00	
Lee, Charles H. ’92–’93	10 00	
Leenheer, Bastian ’93	5 00	
Legendre, Joseph A. ’93	5 00	
Lehn, Louis ’93–’94	10 00	
Lehnkering, Charles F. ’93	5 00	
Leis, George ’93	5 00	
Leonardi, Sydney B. ’93	5 00	
Leonhard, Rudolph E. ’93–’94	10 00	
Lernhert, August ’94	5 00	
Levy, Adolph ’93	5 00	
Amount carried forward	$3230 00	$77 50

	Annual Dues.	Certificates.
Amount brought forward	$3230 00	$77 50
Lewis, Ernest G. ’93	5 00	
Libby, Henry F. ’93	5 00	
Livingston, Barent V. B. ’94	5 00	
Lloyd, John U. ’94	5 00	
Loehr, Theodore C. ’93	5 00	
Loelkes, Alexander G. ’93	5 00	
Long, Jonathan C. ’93	5 00	
Lord, Frank J. ’93	5 00	
Lord, Thomas ’94	5 00	
Lowd, John C. ’94	5 00	
Lowden, John ’93	5 00	
Lundberg, John C. ’92–’93–’94	15 00	
Lyman, Asahel H. ’93	5 00	
Lyons, Albert B. ’92–’93	10 00	
Lyons, Fred. W. ’93	5 00	
Lyons, Isaac L. ’94	5 00	
Macdonald, Daniel T. ’93	5 00	
Maclagan, Henry ’93	5 00	
Main, Thomas F. ’93–’94	10 00	
Maine, August ’94	5 00	
Majer, Oscar ’93	5 00	
Major, John R. ’94	5 00	
Mallinckrodt, Edward ’93	5 00	
Mann, Albert ’94	5 00	
Marshall, Ernest C. ’94	5 00	
Marshall, Rush P. ’93	5 00	
Marsteller, George L. ’93	5 00	
Martin, John C. ’93	5 00	
Martin, Nicholas H. ’93–’94	10 00	
Martin, Robert R.	....	7 50
Martinez, Robert J. ’93	5 00	
Massey, William M. ’93	5 00	
Matkin, George G. ’93	5 00	
Matthews, Charles E. ’93	5 00	
Mattingly, George J. ’94	5 00	
Mattison, Thomas C. ’93	5 00	
May, Arthur F. ’92–’93	10 00	
May, Eugene ’94	5 00	
May, James O. ’94	5 00	
Mayo, Caswell A. ’93	5 00	
McAfee, John J. ’93	5 00	
McCoy, Clarence H. ’93	5 00	
McDonald, George ’93	5 00	
McFarland, Andrew ’93	5 00	
McFarland, Robt. M. ’93	5 00	
McIntyre, Ewen ’93–’94	10 00	
McKesson, G. Clinton ’93–’94	10 00	
McKesson, John, Jr. ’94	5 00	
McMichael, Americus O. ’93	5 00	
McNeil, John M. ’94	5 00	
Means, John C. ’93	5 00	
Mehl, Henry W. ’93	5 00	
Meininger, Albert ’94	5 00	
Meissner, F. W., Jr. ’93–’94	10 00	
Meissner, Paul E. ’93	5 00	
Melville, William M. ’93	5 00	
Melvin, Samuel H. ’93	5 00	
Mendoza, Francis ’93	5 00	
Mennen, Gerhart ’93	5 00	
Merrell, Ashbel H. ’93	5 00	
Merrell, Charles G. ’93–’94	10 00	
Merrell, George ’93–’94	10 00	
Metz, Abraham L. ’92–’93	10 00	
Metzger, George F. ’93	5 00	
Meyer, Christian F. G. ’93	5 00	
Meyer, William V. ’93	5 00	
Miller, Adolph W. ’94	5 00	
Miller, James M. ’93	5 00	
Miller, Jason A. ’94	5 00	
Milligan, Decatur ’94	5 00	
Miner, Maurice A. ’93	5 00	
Miner, Mrs. Mary O. ’93–’94	10 00	
Mittelbach, William ’94	5 00	
Miville, Francis C. ’93	5 00	
Moffett, Thomas J. ’93	5 00	
Amount carried forward	$3665 00	$85 00
Amount brought forward	$3665 00	$85 00
Mohr, Charles ’93	5 00	
Moody, Richard H. ’93	5 00	
Moore, Charles G. ’93	5 00	
Moore, George ’94	5 00	
Moore, Joachim B. ’94	5 00	
Moore, John T. ’94	5 00	
Moore, Josh. F. ’93	5 00	
Moore, Silas H. ’93	5 00	
More, Arthur J. ’93	5 00	
Morgan, Aylmer L. ’94	5 00	
Morgan, Eugene H. ’93	5 00	
Morland, Robert L. ’93	5 00	
Morley, William J. ’92–’93	10 00	
Morris, William G. ’93	5 00	
Morwessel, Henry ’93	5 00	
Moulton, Daniel P. ’94	5 00	
Mowry, Albert D. ’94	5 00	
Mueller, Adolph ’94	5 00	
Mueller, Otto E. ’93	5 00	
Munson, Luzerne I. ’93–’94	10 00	
Murphy, John J. ’93	5 00	
Myers, Daniel ’94	5 00	
Nattans, Arthur ’93–’94	10 00	
Neathery, James M. ’93	5 00	
Neppach, Stephen A. ’93	5 00	
Newbold, Thomas M. ’93	5 00	
Newman, George A. ’93	5 00	
Newton, Philo W. ’93	5 00	
Nichols, John C. ’93	5 00	
Nipgen, John A. ’94	5 00	
Nisbet, William W. ’93	5 00	
Noble, William W. ’93	5 00	
Noll, Matthias ’94	5 00	
Nowers, Lawrence E. ’94	5 00	
O’Hare, James ’93–’94	10 00	
O’Neil, Henry M. ’93	5 00	
Odell, Willis B. ’93	5 00	7 50
Ogden, John ’91–’92–’93	15 00	
Oglesby, Geo. D. ’93	5 00	
Ohliger, Lewis P. ’93	5 00	
Oldberg, Oscar ’93	5 00	
Oleson, Olaf M. ’93–’94	10 00	
Oliver, William M. ’94	5 00	
Orton, Ingomar F. ’94	5 00	
Osgood, Hugh H. ’93–’94	10 00	
Osmun, Charles A. ’93	5 00	
Otis, Clark Z. ’93	5 00	
Otto, John N. W. ’93	5 00	
Overstreet, William P. ’93	5 00	
Owens, James A. ’94	5 00	
Owens, Richard J. ’94	5 00	
Parcher, George A. ’94	5 00	
Parker, Arthur S. ’93	5 00	
Parker, George H. ’93	5 00	
Parkill, Stanley E. ’93	5 00	
Parrott, John E. ’93	5 00	
Parsons, John ’94	5 00	
Partridge, Charles K. ’93	5 00	
Patch, Edgar L. ’94	5 00	
Pattison, Charles H. ’93	5 00	
Pattison, George H. ’93	5 00	
Patton, John F. ’94	5 00	
Patton, Joseph ’93–’94	10 00	
Pauley, Frank C ’93	5 00	
Peacock, Josiah C. ’93	5 00	
Pease, Autumn V. ’93–’94	10 00	
Pease, Francis M. ’94	5 00	
Peck, George L. ’93–’94	10 00	
Peniston, Paul ’93	5 00	
Pennington, T. H. Sands ’91	5 00	
Percy, William G. ’93	5 00	
Perkins, Benjamin A. ’94	5 00	
Perkins, Charles W. ’93	5 00	
Perkins, William A. ’94	5 00	
Perry, Frederick W. R. ’93	5 00	
Amount carried forward	$4095 00	$92 50

	Annual Dues.	Certificates.
Amount brought forward	$4095 00	$92 50
Petsche, Bismarck W. '93	5 00	
Pettit, Henry M. '94	5 00	
Peyton, Robert D. '93	5 00	
Pfeiffer, John '93	5 00	
Pfingst, Edward C. '93	5 00	
Pfingsten, Gustav '93	5 00	
Pfunder, William '93	5 00	
Phillips, Charles W. '94	5 00	
Physick, Henry S. '93	5 00	
Pickett, John H. '94	5 00	
Pieck, Edward L. '93	5 00	
Pierce, William H. '94	5 00	
Pitt, John R. '94	5 00	
Pleasants, Charles H. '93-'94	10 00	
Plummer, David G. '93	5 00	
Plummer, Edward '93	5 00	
Plummer, Joseph W. '93	5 00	
Porter, Chilton S. '93	5 00	
Porter, Henry C. '94	5 00	
Porter, Louis F. '94	5 00	
Porter, Millett N. '93	5 00	
Potts, David G. '93	5 00	5 00
Powell, Robert B. '94	5 00	
Power, Frederick B. '94	5 00	
Preissler, H. W. '93	5 00	
Prescott, Albert B. '94	5 00	
Prescott, Horace A. '93-'94	10 00	
Preston, Calvin W. '93	5 00	
Preston, David '94	5 00	
Prieson, Adolph '93	5 00	
Probeck, George J. '93	5 00	
Punch, William F. '93	5 00	
Purcell, Nicholas S. '93	5 00	
Quackinbush, Benjamin F. '93-'94	10 00	
Qvale, Victor A. '93	5 00	
Rademaker, Herman H. '93	5 00	
Radford, Reuben L. '93	5 00	
Ramsperger, Gustavus '93-'94	10 00	
Rand, Daniel M. '93-'94	10 00	
Randall, Frank O. '93	5 00	
Rapelye, Charles A. '93	5 00	
Ray, Frederick E. '93	5 00	
Ray, Peter W. '93	5 00	
Redsecker, Jacob H. '93	5 00	
Reed, Charles C. '93	5 00	
Reed, James '93	5 00	
Reed, Willoughby H. '93	5 00	
Renz, Frederick J. '93	5 00	
Reynolds, Howard P. '94	5 00	
Reynolds, John J. '93	5 00	
Reynolds, William K. '93-'94	10 00	
Rhoades, Stephen H. '93	5 00	
Rhode, Rudolph E. '94	5 00	
Rice, Charles '93-'94	10 00	
Rich, Willis S. '93-'94	10 00	
Richardson, Horatio S. '94	5 00	
Ricksecker, Theodore '93	5 00	
Riddell, Benjamin F. '94	5 00	
Ridgway, Lemuel A. '93	5 00	
Riesenman, Joseph '93	5 00	
Riley, Charles W. '93	5 00	
Rives, Edward B. '93	5 00	
Robert, William H., Jr. '93	5 00	
Roberts, Daniel J. '93	5 00	
Robins, Wilbur F. '93	5 00	
Robinson, Edward A. '94	5 00	
Robinson, Ernest F. '93	5 00	
Rockefeller, Lucius '94	5 00	
Rogers, Arthur H. '93	5 00	
Rogers, Wiley '93	5 00	
Rogers, William H. '93-'94	10 00	
Rohde, Claus F. '93	5 00	
Rowlinski, Robert A. '93	5 00	
Rudolph, Eliza '93	5 00	
Ruenzel, Henry G. '94	5 00	
Amount carried forward	$4515 00	$97 50
Amount brought forward	$4515 00	$ 97 50
Ruete, Theodore W. '93	5 00	
Runyon, Edward W. '93	5 00	
Ruppert, John '94	5 00	
Rusby, Henry H. '93-'94	10 00	
Rust, William '94	5 00	
Ryan, Frank G. '93-'94	10 00	
Sadtler, Samuel P. '93	5 00	
Sanderson, Stephen F. '93	5 00	
Sargent, Ezekiel H. '93	5 00	
Sargent, Jesse W. '94	5 00	
Sauer, Louis W. '93	5 00	
Sauerhering, Rudolph A. '94	5 00	
Saunders, William '94	5 00	
Sawyer, Willey W. '93	5 00	
Sawyer, William F. '93	5 00	
Sayre, Edward A. '93-'94	10 00	
Sayre, Lucius E. '94	5 00	
Sayre, William H. '93	5 00	
Schaap, John '93	5 00	
Schafer, George H. '93	5 00	
Schafhirt, Adolph J. '94	5 00	
Scheffer, Emil '93	5 00	
Scheffer, Henry W. '94	5 00	
Schellentrager, E. A. '93	5 00	
Scherer, Andrew '94	5 00	
Scherff, John P. '94	5 00	
Scherling, Gustav '93-'94	10 00	
Schieffelin, William J. '93-'94	10 00	
Schiemann, Edward B. '93	5 00	
Schlaepfer, Henry J. '94	5 00	
Schley, Steiner '93	5 00	
Schmid, Henry '93	5 00	
Schmidt, Ferdinand T. '93	5 00	
Schmidt, Florian C. '94	5 00	
Schmidt, Frederick M '93	5 00	
Schmidt, Valentine '93	5 00	
Schmitt, Carl '93	5 00	
Schmitt, George J. F. '94	5 00	
Schoettlin, Albert J. '93	5 00	
Scholz, Edmund L. '93	5 00	
Schrader, Herman v. R. '93	5 00	
Schrank, C. Henry '94	5 00	
Schueller, Ernst, '94	5 00	
Schueller, Frederick W. '94	5 00	
Schurk, Louis '93	5 00	
Schwab, Leslie W. '94	5 00	
Schweickhardt, Richard '93	5 00	
Scott, Alex. W. '93	5 00	
Scott, George T. '93	5 00	
Scott, J. McDonald '93	5 00	
Scott, William H. '93	5 00	
Scoville, Wilbur L. '94	5 00	
Searby, William M. '93	5 00	
Sedberry, Bond E. '93	5 00	
Seifert, Charles A. '93	5 00	
Seitz, Oscar '93	5 00	
Selzer, Eugene R. '93	5 00	
Sempill, Walter M. '93	5 00	
Sennewald, Ferdinand W. '93	5 00	
Serodino, Herman '93	5 00	
Shafer, Erwin C. '93	5 00	
Shannon, Thomas R. '93	5 00	
Sharp, Harry '93	5 00	
Sharples, Stephen P. '94	5 00	
Shaw, Robert J. '93	5 00	
Sherrard, Charles C. '93	5 00	
Sherwood, Louis W. '94	5 00	
Shiels, George E. '93	5 00	
Shoemaker, Richard M. '94	5 00	
Shreve, John A. '93	5 00	
Shriver, Henry '93	5 00	
Shryer, Thomas W. '93-'94	10 00	
Shultz, Merriken E. '93	5 00	
Shurtleff, Israel H. '93-'94	10 00	
Sieker, Ferdinand A. '93	5 00	
Amount carried forward	$4925 00	$97 50

	Annual Dues.	Certificates.
Amount brought forward......	$4925 00	$97 50
Siekman, Ivan F.............'93	5 00	
Simmon, Carl.................'90	5 00	
Simon, William ....'94	5 00	
Simons, Arthur H............'94	5 00	
Simonson, William...........'93	5 00	
Simpson, William............'93	5 00	
Simson, Francis C. ....'93-'94	10 00	
Sippy, Alvin H...............'93	5 00	
Skelly, James J...........'93-'94	10 00	
Slack, Henry R., Jr..........'93	5 00	
Slater, Frank H..............'94	5 00	
Sleuman, Charles A. ....'93	5 00	
Slocum, Frank L.............'93	5 00	
Smink, Robert W. ....'93	5 00	5 00
Smith, B. Frank..........'93-'94	10 00	
Smith, Charles B.............'93	5 00	
Smith, Clarence P............'93	5 00	
Smith, Edward S.............'93	5 00	
Smith, Frank R..............'93	5 00	
Smith, George S. ....'93	5 00	
Smith, J. Hungerford ....'93	5 00	
Smith, Joseph S..............'93	5 00	
Smith, Lauriston S...........'94	5 00	
Smith, Linton................'94	5 00	
Smith, Linville H. ....'93	5 00	
Smith, Reuben R.............'93	5 00	
Smith, Samuel W.............'94	5 00	
Smith, Theodoric ....'93	5 00	
Smith, Willard A.............'93	5 00	
Smith, William C. ....'93	5 00	
Smithson, David E ......'93-'94	10 00	
Sniteman, Charles C. ....'93	5 00	
Snow, Charles W.............'94	5 00	
Snyder, Alva L...............'93	5 00	
Snyder, Robert J.............'93	5 00	
Soetje, Edward C.............'93	5 00	
Sohn, Frank..................'93	5 00	
Sohrbeck, G. Henry......'93-'94	10 00	
Sombart, John E. ....'93	5 00	
Sords, Thomas V.............'93	5 00	
Spalding, Warren A..........'94	5 00	
Spengler, John G.............'93	5 00	
Spenzer, Peter I..............'93	5 00	
Sperry, Herman J............'94	5 00	
Squibb, Edward H. ....'94	5 00	
Squibb, Edward R. ....'94	5 00	
Squires, George B. ....'93-'94	10 00	
Stacey, Benjamin F. ....'93	5 00	
Staebler, Richard ....'93	5 00	
Stahler, William ....'94	5 00	
Stahlhuth, Ernst H. W. ....'93	5 00	
Stam, Colin F................'93	5 00	
Stamford, William H. ....'93	5 00	
Stanley, Edgar C. ....'93	5 00	
Stark, Harry ....'93	5 00	
Stearns, Henry A. ....'94	5 00	
Steele, James G. ....'93	5 00	
Stein, Jacob H...............'93	5 00	
Steinhauer, Frederick ....'93	5 00	
Stendel, Guthardt............'93	5 00	
Stevens, Alonzo B. ....'93-'94	10 00	
Stevens, Fred. D. ....'93	5 00	
St. Martin, Theophilus.......'93	5 00	
Stoff, Louis ....'93-'94	10 00	
Storck, Jacob A..............'93	5 00	
Stoughton, Dwight G.........'93	5 00	
Stowell, Daniel ....'93	5 00	
Strathman, Charles A. ....'93	5 00	
Summers, James W. F........'93	5 00	7 50
Sumner, Alphonso ....'94	5 00	
Tailby, Joseph A.............'93	5 00	
Tanke, Ernst J...............'93	5 00	
Taylor, George A. ....'93	5 00	
Taylor, John P...........'93-'94	10 00	
Taylor, Walter T.............'93	5 00	
Amount carried forward.......	$5345 00	$110 00

	Annual Dues.	Certificates.
Amount brought forward......	$5345 00	$110 00
Thatcher, Hervey D. .... ..'94	5 00	
Thomas, Oscar E.........'92-'93	10 00	
Thomas, Robert, Jr. ....'93	5 00	
Thomasson, Anders ....'94	5 00	
Thompson, William Scott ....'94	5 00	
Thompson, William S. ....'93	5 00	
Thomsen, John J., Jr.... ....'94	5 00	
Thorn, Henry P. ....'94	5 00	
Thurston, Azor ....'93-'94	10 00	
Tiarks, Hermann ....'94	5 00	
Tigner, James O. ....'93	5 00	
Tobey, Charles W............'93	5 00	
Todd, Albert M. ....'93-'94	10 00	
Topley, James...............'94	5 00	
Torbert, Willard H. ....'94	5 00	
Tracy, David W. ....'93	5 00	
Trautmann, Ludwig..........'93	5 00	
Travis, J. Walton............'91	5 00	
Travis, Miles B. ....'93	5 00	
Treat, Joseph A. ....'93-'94	10 00	
Trimble, Henry..............'94	5 00	
Troppmann, Charles M ......'93	5 00	
Truax, Charles ....'94	5 00	
Tscheppe, Adolph ....'93	5 00	
Tucker, Greenleaf R. ....'93	5 00	
Tucker, Mosely F............'93	5 00	
Turrell, Judson W. ....'93	5 00	
Tyner, Charles O.............'93	5 00	
Uhlich, Ferdinand G. ....'93	5 00	
Upson, Rosa ....'93	5 00	
Urban, Jacob P. ....'94	5 00	
Van Antwerp, Andrew ....'93	5 00	
Van Antwerp, Garet ....'93	5 00	
Van Auken, Jerrie A. ....'93	5 00	
Van Winkle, Abraham W.....'93	5 00	
Vargas-Heredia, Jorge.........	....	7 50
Varney, Edward F........'93-'94	10 00	
Vaughan, Parry W...........'93	5 00	
Vennard, Wm. L.............'93	5 00	
Viallon, Paul L. ....'91-'92	10 00	
Vockroth, Emil ....'93	5 00	
Voge, Richard ....'93	5 00	
Voight, Joseph F. ....'93	5 00	
Vordick, August H...........'93	5 00	
Voss, George W. ....'94	5 00	
Walker, Joel P...............'93	5 00	
Walker, John P. ....'94	5 00	
Wall, Otto A.................'93	5 00	
Wangler, Conrad D. ....'94	5 00	
Ward, A. Jae ....'93	5 00	
Ward, Charles A.............'94	5 00	
Ward, George J. ....'93	5 00	
Warn, William E.............'94	5 00	
Warren, Edwin A. ....'93	5 00	
Warren, William M. ....'93	5 00	
Washburn, Harry M. ....'93	5 00	
Watson, Herbert K....... ...'93	5 00	
Watson, Sidney P............'93	5 00	
Waugh, George J.... ....'93-'94	10 00	
Weaver, John A..............'93	5 00	
Webb, William H ....'94	5 00	
Weber, Herman A............'93	5 00	
Weber, John H. ....'93	5 00	5 00
Weeks, B. Frank.............'93	5 00	
Wehrly, Thomas M. ....'94	5 00	
Weidemann, Charles A....'93-'94	10 00	
Weihe, Otto A. ....'93	5 00	
Weinman, Oscar C........'93-'94	10 00	
Welch, Willard C. ....'93	5 00	
Wells, Chas. H...............'93	5 00	
Wells, Edwin H..............'93	5 00	
Wendell, Henry E............'94	5 00	
Wenzell, William T. ....'93	5 00	
Werner, Rudolph C.......'93-'94	10 00	
West, Charles A..............'94	5 00	
Amount carried forward.......	$5765 00	$122 50

	Annual Dues.	Certificates.
Amount brought forward......	$5765 00	$122 50
Westman, F. H. ....'93	5 00	
Wetherell, Albert S...........'94	5 00	
Wetterstroem, Albert.........'93	5 00	
Whall, Joseph S..............'93	5 00	
Wharton, John C.............'93	5 00	
Wheat, Eli M. ....'93	5 00	
Wheeler, William D..........'93	5 00	
Whelpley, Henry M..........'93	5 00	
Whitcomb, Frederick E.......'93	5 00	
White, Richard E. ....'93	5 00	
White, William H............'93	5 00	
Whiting, Frederick T.........'94	5 00	
Whitman, Nelson S...........'94	5 00	
Wichelns, Frederick..........'94	5 00	
Wickham, William H.........'94	5 00	
Wilcox, Frederick........'93-'94	10 00	
Wilhite, Frank T.............'93	5 00	
Wilder, George P.........'93-'94	10 00	
Willet, G. Howard ....'93	5 00	
Williams, Charles F. ....'93	5 00	
Williams, Duane B...........'93	5 00	
Williams, Edward M. ....'93	5 00	
Williams, George G.......'93-'94	10 00	
Williams, John K. ....'93	5 00	
Williams, Richard W.........'94	5 00	
Williams, Seward W..........'93	5 00	
Williams, William H. ....'93	5 00	
Wills, Fred. M...............'93	5 00	
Wilson, Benjamin O..........'94	5 00	
Amount carried forward.......	$5925 00	$132 50

	Annual Dues.	Certificates.
Amount brought forward......	$5925 00	$122 50
Wilson, William ....'93	5 00	
Winnberg, John M...........'93	5 00	
Winters, John H. ....'93	5 00	
Wood, Alonzo F., Jr..........'94	5 00	
Wood, Edward S.......... ..'94	5 00	
Wood, George M.............'93	5 00	
Wood, James P...............'94	5 00	
Woodman, Walter I..........'93	5 00	
Woods, Silas E...............'93	5 00	
Wooldridge, Daniel T. ....'94	5 00	
Woolley, Stephen D...'91-'92-'93	15 00	
Wooten, Thomas V...........'93	5 00	
Wray, George B. ....'94	5 00	
Wright, Edward E............'93	5 00	
Wulling, Frederick J. ....'93	5 00	
Wunderlich, Edward.........'93	5 00	
Wurmb, Theodore H.........'93	5 00	
Young, John K...............'93	5 00	
Youngs, William.............'93	5 00	
Zahn, Emil A. ....'93	5 00	
Zellhoefer, George...........'93	5 00	
Ziegler, Philip M.............'94	5 00	
Zimmer, Harry E.............'93	5 00	
Zimmerman, Charles ....'94	5 00	
Zimmermann, Albert..........'93	5 00	
Zoeller, Edward V.. ....'93	5 00	
Zuenkeler, J. Fred. ....'94	5 00	
Zwick, George A.............'94	5 00	
Total	$6075 00	$122 50

MINUTES

OF THE

SECTION ON COMMERCIAL INTERESTS.

FIRST SESSION, TUESDAY AFTERNOON, SEPTEMBER 4.

In the absence of Mr. Rogers, the Chairman, the Section was called to order at 4 p. m. by Mr. Burge, who spoke as follows:

Mr. Rogers, of Louisville, being absent, it devolves upon me to call this Section to order. I hope you will appoint some one to fill the Chair, as I am the Secretary and not the Chairman of this Section.

Mr. Ebert, of Chicago, was then nominated as Chairman.

MR. EBERT: No, I want to be on the floor.

PROF. GOOD: I nominate George J. Seabury, as temporary Chairman of this Section.

This was agreed to.

Mr. Seabury, upon taking the Chair, said:

Gentlemen, it seems to me that in the absence of the Chairman, and the scarcity of members to discuss subjects of such extreme importance to every Pharmacist in the United States, this meeting should be adjourned to the time of the second session that has been allotted to us, which I think is to-morrow morning.

I would regard it as a farce to go on with so few members, and if possible we should adjourn until to-morrow morning at 10 o'clock, and make the questions before us the first order of business. Commercial questions in my judgment are of more importance to the members of the Association at the present time than any scientific paper we could discuss.

Fellow members, our affairs are undergoing a revolution; let us debate our trials and tribulations in a large meeting. This Section was formed for wholesome purposes; the process of evolution has developed the discussion of collateral and often serious questions, which should not be discussed by a handful of members of the Association, but by as many men as it is possible to cram into this room, and it will be interesting—yes, the most interesting of all the sessions of the Sections of the Association, on the ground that its discussion affects the bread and butter brigade.

As I said before, there is something beyond the present situation that we must consider, and therefore it is wisdom to postpone our general discussion until to-morrow morning.

MR. EBERT: Is there not enough work in the hands of the Secretary, that we could go into this afternoon, even with a small audience. We are going to have another session to-morrow, and the more important matter could be brought up to-morrow morning.

MR. SHEPPARD: I would like Prof. Patch to state a communication made to him in regard to the other session.

PROF. PATCH: The recommendation came to Council this morning that if possible the work of this Section should be finished this afternoon, that the time assigned to-morrow morning might be given to the Section on Legislation, which has a great deal of important matter to discuss; it being understood that there were no papers of any moment to be brought before this Section, and so far as they were informed nothing arranged for discussion. Of course it is for this Section to decide, for Council could not make an assignment until the business of this Section was complete. You must have two sessions, and if there is not enough work to necessitate another session to-morrow, why after being in session a short time we could adjourn for five minutes, and again come to order, and then adjourn and two sessions be had this afternoon. Of course if there are matters of importance to involve the use of all this afternoon, the time to-morrow belongs to this Section.

THE CHAIRMAN: Of course, gentlemen, you must understand in accepting the Chair, I did so unfamiliar with any work that might be in the hands of the Secretary. If the Secretary has any matter outside of a general discussion, we will not oppose any objection.

PROF. PATCH: If the Chairman will permit, the official programme is this: "Tuesday, September 4th, 3 p. m., Section on Commercial Interests; Wednesday, September 5th, 9 a. m., Section on Commercial Interests;" so that it will be seen that to-morrow morning has been properly assigned to this Section, so that there will be no error and no departing from our By-Laws, and the correct arrangement is embraced in this programme.

THE CHAIRMAN: According to the programme as in my printed procedure, there is a session of the Commercial Section to-morrow morning. If the Secretary has any communications they will be in order.

THE SECRETARY: I have no communication, have received no papers. I wrote to Dr. Rogers in regard to getting up a list of queries. He said at that time that he was indisposed and was going to the mountains for a while, and after he came back he would communicate with me; but I have never heard anything from him since, and I have no papers whatever.

MR. SHEPPARD: Since coming to this meeting I have received a telegram from the Chairman of this Section of last year, Mr. Willard Torbert, of Dubuque, Ia., which reads as follows: "Ask the Section on Commercial Interests to pass a resolution commending the passing of regulations for tariff and free alcohol for the arts. Kind regards to all members. Willard H. Torbert." It is taken for granted of course that any action of this kind belongs to the Section on Commercial Interests. I have not brought it before the Association proper, but now would offer the following resolution:

Resolved, That it is the sense of the American Pharmaceutical Association that the action of the Congress of the United States in legislating for free alcohol for use in the arts is to be commended.

This is to be acted upon, you will understand, upon the recommendation of Mr. Torbert.

THE CHAIRMAN: Gentlemen, you have heard the resolution. Is there to be any debate upon it?

MR. RYAN: I would like to say, before that can be intelligently voted upon, that we will have to hear from the Department at Washington to know what regulations they are going to impose. I believe authority is in the hands of the Secretary to impose any regulations that he sees fit, and it may be those regulations will so construe the act that it will cost a great deal more to make preparations than it did before.

MR. MAIN: In order to bring that matter before the body, I would second Mr. Sheppard's resolution. It seems to me it would be well if Mr. Sheppard would add that this body appoint a committee to look into this matter and to act possibly with a committee on legislation of the National Wholesale Druggists' Association in securing that object—the adoption of such regulations as will be suitable.

MR. SHEPPARD: I shall be glad to accept that amendment.

MR. RYAN: This is going to prove quite an important matter, and cannot be run over lightly.

MR. C. E. DOHME: I had occasion to go with my brother to Washington in relation to this alcohol question a few days before leaving for Asheville. We were received by the Commissioner, who was very anxious to get some information as to how to construe the law, as he had no idea how to arrange it, and no one else in his department had any idea they would be able to arrange for any remission of the tax. He wanted to know, because we are using alcohol in quite large quantities, what to do to recover the tax. He had no idea at all what regulations would be adopted, nor could any one say in the department how it would be possible to remit this tax. It is one of those things passed at the ninth hour, and the department is utterly in the dark and would like some information. It is one of those regulations that will never amount to anything in practice. I don't think the tax will be remitted. In my opinion it would not do any harm to reserve the stamps off the alcohol barrels, and finally claim for their use, when the time came for them to be filed, but the question is whether we will get anything.

MR. EBERT: I do hope the retail druggists of this country, through the American Pharmaceutical Association, will not mix up in this matter. Now, do not do it! Don't you ask Congress to remit any tax or to do anything about it. Don't put your hand on it. Don't ask for any favor of that kind. You don't know what the outcome is going to be. Where are you going to be any better off? The restrictions may be of a character that we as retail druggists may never be able to take out a single gallon of spirit, while the manufacturers can take out all they want, and it is the death-knell of Pharmacy in this country. Where are you going to make your factories? How are you going to compete? You will buy everything you have of the wholesale druggists. Don't think of getting free alcohol—at least don't ask for it. Don't let us have any resolution asking for it. Don't make any more whiskey and rum sellers of the druggists than you can help. We asked that the tax be taken off from proprietary goods. Look at the records. At the time when I protested against that stamp tax being taken off what did the manufacturers say? "The price will be reduced to you, gentlemen." Was it reduced? No; the moment the stamp tax was taken off and we asked for a reduced price, they said, "We are going to use that money for the purpose of advertising and you will sell more of it." We are to-day in the hands of the manufacturers as to this question. As a retail druggist I beg of you to do nothing of the kind. It is not necessary for you to do anything of this kind; don't do it. I know what I am talking about.

MR. CRISSWELL: I would like to make a suggestion to be thought about with regard to this alcohol tax, and that is, when the Commissioner of Internal Revenue and the Secretary of the Treasury construe the bill so as to cover retail druggists, they will require them to manufacture their preparation in bonded warehouses, and they will be in a pretty bad fix, because the government will not be at the expense of putting up bonded warehouses in a great many places where they do not have them at the present time; of course the wholesale manufacturers have the advantage, and it is the retail druggist who will suffer.

The Chairman: I would like to say, that this is a very interesting and complicated question. The fact has already been presented to inquirers on this subject in such a way that the Treasury Department has been unable to offer any solution. The American Pharmaceutical Association is an interested factor. I think we are justified in defending ourselves. I would suggest that some member move to appoint a committee of three to draft resolutions; they would embody and be in conformity with our ideas on the subject; as it has been well stated by Mr. Dohme, the Department is at sea; they know little or nothing about the matter or about regulations on the alcohol question.

I believe, under the circumstances, a committee of three sent by us to Washington, will plead our interests, to our entire satisfaction. A committee of three to talk this matter over, and offer the resolutions at the meeting to-morrow, might get something in the way of help on this free alcohol question. I myself believe that there is very little for us to do until the government itself takes a stand in the matter.

Prof. Good: Unfortunately Mr. Sheppard's resolution will do us no good, according to my opinion. Now those of us who have been in the habit of attending these meetings, and listening to these discussions year after year, will remember the feeling that we put into the resolutions which were sent to the government asking for free alcohol, and can imagine our disappointment. A good, well-meaning friend, I believe it was Mr. Hoar, of Massachusetts, introduced this amendment, and made it too far-reaching; all we asked for was free alcohol in the arts, and that is all covered by Mr. Sheppard's resolution, but this amendment offered by Mr. Hoar calls for free alcohol in the arts, and in medicinal preparations, and it calls for so much we can do nothing with it, and that is a misfortune. I think Mr. Sheppard's resolution is worthless. It does not apply to what we propose to give thanks for. We cannot give thanks for a thing so tantalizing that we would like to take the benefit of it, but we are afraid to; so I am opposed to the passage of the resolution.

Mr. Sheppard: Perhaps Prof. Good will not be against this resolution:

Resolved, That the action of the Congress of the United States, in legislating for free alcohol in the arts, should be commended; and that a committee of three, of which E. R. Squibb shall be one, shall be appointed by the Chair to secure such regulation, for the use of free alcohol in medicine as shall be of benefit to the drug trade.

Mr. Main states what many of us know to be a fact, that Dr. E. R. Squibb is intensely interested in this subject, and is a man thoroughly posted on the alcohol question.

Prof. Good: Will Mr. Sheppard read that resolution again?

Mr. Sheppard: (reading) A committee of three, of whom Dr. Squibb shall be one, shall be appointed by the Chair to act with a committee of the National Drug Association, to secure such regulations for free alcohol in use in medicine as will be of benefit to the drug trade.

Prof. Good: I really do not think it is possible to make any regulations which will allow us to use free alcohol in medicine. I don't see how it is possible, as it must involve the carrying out of regulations for the supervision of every drug store in the United States.

MR. EBERT: If you will just think one moment—

MR. MASON: I beg to second the resolution.

PROF. GOOD: Does the original resolution interfere with this?

MR. WHITNEY: We are asked by resolution, as I understand it, to commend the action of Congress, and we are told by a member of the Association who visits the Secretary who has charge of this matter, that he knows nothing about it, and no one in his department knows anything about it, and from his investigation at Washington he thinks that nothing will come of it. It seems to me that places us in a position very far from commending the action, without any further interpretation. I rise merely, however, to call attention to the remarks of Mr. Ebert, of Chicago—in a few words there is a whole volume of large size. The retail pharmacist is not able to attend to lobby work, to visit Washington: the large manufacturer is, his interests are large. The first thing to be expected, and I warn you against it, the first thing to be accomplished will be free alcohol to manufacturers, and to retailers not a cent. They will never get a quart of alcohol free. The manufacturers, as I have suggested, will fill every department store with essence of peppermint and the like, made from alcohol which costs them 50 cents a gallon while every one of us poor dealers have to pay $2.60; that is just what it is. Now gentlemen, read between the lines, taking Mr. Ebert's remarks, and you have the whole illustrated. Now we are asked to commend action that cuts our throats. How many members of this American Pharmaceutical Association can go to Denver next year if this is put upon us, or Montreal, or anywhere else? We cannot stay in our homes, we will go to the demnition bow-wows. We will not have money enough left to leave home. We want to go slow in commending. It is the other class who are attempting to rope us in. When we do anything we want to do it intelligently, and know what we are doing. Then I shall be most happy to render them thanks, and until that time comes, I say no, not a word.

MR. MAIN: In reply to Mr. Whitney, I would say that manufacturers could be trusted to look after themselves. It was for that reason that I moved that a committee be appointed to look after the interests of the drug trade. I am informed—I don't know this personally—that there are some new regulations in Germany in regard to the use of alcohol for preparing medicine, which extend to the retail drug trade. Mr. Plaut, of New York, informed me of that; I asked him for the details, and he has sent for those regulations. Now it seems to me at various times that we have talked about free alcohol for use in the arts and medicine, and by a mistake this has crept into the new tariff bill. As stated by Mr. Dohme, the Secretary of the Treasury, does not know what to do with it, and I am advised he does not propose to adopt any rules or regulations; he proposes, as I am informed, to let the matter lie over until the next Congress has assembled, with the idea that the provision for free alcohol will be repealed, or of throwing the burden of the formation of rules and regulations upon the trades interest. The idea of course is that the government's interests shall be fully protected, and allow the free use of alcohol for use in the arts and medicine to extend as far as can be done with safety to the government. It seems to me that it would be perfectly proper and in line with the objects of this Commercial Section for us to appoint a strong committee. The suggestion is made that Dr. Squibb should be one of the committee. Dr. Squibb made a study of this subject of alcohol for use in the arts and manufactures a few years ago, and appeared before the Ways and Means Committee at the time the Mills Tariff Bill was talked of, and had some very valuable statistics. Unfortunately I could not obtain a copy of these when I left New York; in trying to get a copy I was told a copy of his report and remarks could only be obtained from the archives of the Ways and Means Committee at Washington;

I have sent to Washington to get that report, and it does seem to me if it is a possible thing for us to secure free alcohol for use in medicine legitimately we ought to try to do it, and we ought to look into this matter to see what there is in it for the druggists, if anything; if there is nothing in it of course no one would be disappointed, but it seems to me a committee should be appointed to look into this matter.

MR. HALLBERG: I have a copy of the official act—it is very brief, and I think it ought to be read so that we may know just what it refers to.

AN ACT to reduce taxation, and provide revenue for the government and for other purposes.

SECTION 61. Any manufacturer finding it necessary to use alcohol in the arts or in any medicinal or like compound, may use the same under regulations prescribed by the Secretary of the Treasury on satisfying the Collector of Internal Revenue where he resides that he has complied with such regulations.

I want to call your attention to the words, "may use the same under regulations prescribed by the Secretary of the Treasury."

Now I hold it is a physical impossibility to prevent the use of alcohol in theUnited States for medicinal use by simply prescribing certain rules—in other words, without denaturalizing it as it is done in Germany. Now I believe under this section the Secretary of the Treasury will have the right to prescribe as a rule, that alcohol to be used in the arts and for medicine shall be methylated or denaturalized or treated by some other method which will make it unfit for the pnrposes of internal administration. It can be used then for the purposes of a solvent, for shellacs, for varnishes, for cements, and even for the extraction of many drugs where the alcohol is regained by distillation, and possibly even in the manufacture of solid extracts, and in the preparation of the alkaloids; alcohol of this character could be used, but it should be made of such a character that its use for any internal administration would be at once recognized. Now, as you know, in Great Britain and in Canada, as Mr. Morrison probably can tell us, they have used methylated spirits for many years. Now even in England frequently such methylated spirit has been used for external purposes, and I am told in the islands of Scotland the Scots use methylated spirit as their favorite beverage (laughter). The Germans, however, have discovered two compounds which, when added to alcohol, give it a most offensive odor and taste, which makes it entirely unfit for internal use, but does not impair it in any manner for its solvent purposes; and it seems to me that free alcohol should be confined solely to the purposes of a solvent, and not for the purposes of medicinal internal administration. Now inasmuch as I believe the Secretary of the Treasury—if the Chairman would allow me a minute—has the right under the section to prescribe the rules and regulations, it is purely a question to be determined first that we should take the stand that alcohol should be free as to its use as a solvent and not for internal administration as a medicine. For that reason I think no action should be taken such as the appointment of a committee with a person such as Dr. Squibb, to watch these wholesale druggists that they don't take advantage—I would approve the appointment of a different committee under such circumstances.

MR. HOLZHAUER: Before coming away I talked with the chemist of a concern and asked him how they expected to do it, and he told me they expected it would be done in exactly the same manner as lead is shipped into the country. A refinery is made a bonded warehouse by the appointment of a government officer to receive the lead, and they expected their factory to be made a bonded warehouse by the appointment of an officer to inspect the alcohol. If that is the case, then those who take the advantage of the act will have to make their factories bonded warehouses.

MR. SHEPPARD: I call attention to the fact that this was Mr. Torbert's idea. He was the Chairman of this Section for two years, and what he asked us to do, can in my judgment be done in a different way. I confess to not being very sanguine in regard to it. I think in justice to the man sending the telegram, and the work he has done for this Section, and the absolute certainty that it can do no harm to take the action, that we should adopt his suggestion and appoint this committee. I certainly hope you will appoint it.

MR. EBERT: One more remark, and I will not say another word. It is this. About four days before I left Chicago, a telegram, by the Associated Press, was published in one of the papers, that James E. Davis, who is connected with the National Wholesale Druggists' Association, and a gentleman whose name I do not remember just now, but with whose name I am familiar—I know he belonged to the Proprietary Association of the United States—were at Washington, and counselling with the Treasury Department in regard to the matter, say that the small druggists may not use free alcohol for proper purposes, as he is irresponsible—that irresponsible small druggists could not use alcohol for different purposes. I want to say that there is a committee in Washington to look after our interests seemingly; another thought is that we have a committee that goes there, and they will meet the committee of manufacturers and the wholesale druggists. As you know, human nature is human nature—we go there together and we try to get something that will benefit all of us. We go, and the manufacturer who can agree to build a bonded warehouse gets all. Where we have helped him along once we will help him again. That is the reason we need not take any action. The law is clear and the government will apply the law. If we find we are going to have too heavy a burden, we then can say we are free agents, and we would be in a better position without such a law.

THE CHAIRMAN: The Chairman would inform the members that not more than a week ago an article appeared in one of our journals which gave the result of an interview between a lawyer and one of our most eminent manufacturing pharmacists, where a very different ground was taken. They went to Washington for the purpose of meeting the Secretary of the Treasury, and pleaded the retention of the tax on alcohol. Now that is the other side of this question. That's the only reason why it would be a good thing for this Section to act on this matter, even at this time. A committee of three would be sufficient to represent our fraternal branches, although apparently somewhat antagonistic, and yet I understand the Council has also placed itself on record, notwithstanding the government has made no restrictions in any special form, and does not know how to explain that question for itself. On general principles, the Chair would rule that the resolutions should be laid on the table, for the simple reason that we have no data from Washington to predictate any action upon.

PROF. GOOD: Will Mr. Sheppard please read that resolution again?

Mr. Sheppard then read the resolution.

PROF. GOOD: It occurs to me that it might be well, inasmuch as we have this thing, to watch it, and therefore, as we cannot undo what has been done, we better have a good committee who will watch our interests and see that we are not imposed upon. I believe in what Mr. Ebert says, that we have gotten what we don't want, and having gotten it we must protect ourselves. I am in favor of appointing this committee from year to year, and we would like, if they can, to have them devise a scheme whereby we can avail ourselves of it. I don't know whether Mr. Hallberg's idea would carry—he spoke of alcohol as a solvent.

MR. HALLBERG: As a solvent, not for internal use. It is necessary to explain it, I think: any preparation or compound that contains alcohol intended for internal use, should not be exempt from tax. Where are we going to draw the line on the tinctures?

MR. WHITNEY: I appear here solely in the interests of the retail pharmacists. I have probably not many more years to suffer or to profit by any action of the Legislature or Congress on this question, but in my experience of the past, when I undertook to do anything with the National Wholesale Dealers' Association, or with the wholesale dealers generally, I find it is not six to me and six to them, but it is nine to them and one to me every time. The stamp tax was taken off, and we were going to get the benefit of that, but we didn't. The rebate was going to be given, which they got and we didn't, and a great many things of that sort have come to our experience. Now it is proposed by this legislation, as I understand it, that wc have a committee to watch the work that is going on in connection with the representatives of the National Wholesale Dealers' Association, to see what they are going to do. From my experience, gentlemen, you will be asked to take a seat, and they will say, "We will take all there is," and you can go fishing, and you will not have any business, and we shall spend our time for nothing; that is the upshot of it, and nothing else. Now, sir, if this law passes, and it is carried out by the Wholesale Dealers' Association, human nature is the same the world over, and they are bound to look for their own interest first, and if there is anything left it would be small, a crumb for the dogs; and I think we have got tired of that, and the very ones figuring and laboring for this would bring into my market compound tinctures, and sell them for little or nothing—the alcohol will not cost them anything, that is, in the way of tax, and they will sell them at three cents an ounce, and so with the essence of peppermint and Huxham's tincture of bark, and I can't say a word against it. If this Association is to establish a ring interest of pharmacists, then go on with this kind of work; and if not, stop. (Applause).

MR. RYAN: Just to correct an impression some of the members seem to have in regard to this question, I want to say if they would take the pains to inquire a little bit of the manufacturers they will find the manufacturers are the only people who don't want the tax taken off; they want it to remain as it is.

MR. HALLBERG: I do not want to speak any more on this subject, but I want to remind Mr. Ebert of one important fact, and that is, free alcohol will enable every pharmacist to make his own fluid extracts, where he is not able to do it now, that is, providing he can obtain the alcohol.

THE CHAIRMAN: It seems to the Chair that the construction of the law is such that I would like to see the special rule applied, that is to say, you cannot prevent the free use of alcohol in pharmacy; you can use it for everything as the law now is, when it enters into the composition of medicine, and when that point is brought up it means alcohol for patent medicine men just as well—for Hostetter's bitters, for every man who sells the so-called medicinal compound tonics, which after all are nothing more or less than a beverage. Now that is the point that the Committee is troubled about at Washington; they do not know where to draw the line, therefore the resolution itself certainly carries no harm with it. As the government has constructed the law, everybody has the right to use it in medicine for any purpose, retailer and wholesaler alike; but the point Mr. Ryan has made I know is true—the manufacturers don't want the tax taken off, because it prevents competition, and by the use of large capital in manufacturing business small men cannot get into it. That is the reason why, for my part, I should be very glad to have free alcohol for all; besides, when taking inventory on a free alcohol basis, our assets would be fatally covered in the manufacture of the legitimate pharmaceutical products.

MR. DADD: I don't think this Association should pass any resolution commending the government for passing that Act. I should think we ought not to do that, and we should stultify ourselves in so doing, because it cannot benefit us or anybody else. I think that we had better lay that on the table, and formulate a resolution to appoint a committee—lay that aside, do not commend the government for action that is not going to benefit us, but is going to hurt us.

MR. MAIN: The way the resolution is drawn it commends the passage of the Act providing for free alcohol for use in the arts. We don't say anything about medicine. And then it provides for one committee to look after our interest. That is the only question about it.

MR. SHEPPARD: The resolution does not refer to the acts by Congress, but that one feature.

MR. EBERT: We have nothing to do with the acts of Congress.

MR. NATTANS: In what respect are we connected with Congress, and why should we commend Congress for passing an Act granting the free use of alcohol in the arts?

THE CHAIRMAN: That is a point well taken. It does not say anything about medicines.

PROF. GOOD: Excuse me for talking so much—I would like to answer Mr. Nattans in this way: We have asked for free alcohol in the arts, meaning by that that we want to use alcohol in the manufacture of chemicals, and therefore we will be greatly benefitted; we cannot compete with foreign manufacturers in the manufacture of chemicals because they have it, and they use it free of duty, and that is what we mean. We will certainly be greatly benefitted if we can get the use of alcohol as a solvent for use in the arts, in the manufacture of chemicals, alkaloids, etc.

MR. DADD: Does the Act not say arts and manufactures?

THE CHAIRMAN: I think it says arts and medicines.

MR. HALLBERG: In the arts, in any medicinal or like compounds.

PROF. REMINGTON: I fail to see by the passing of the resolution in the words that it excludes pharmacy—is not pharmacy an art? Why, if such a law should be passed, I fail to see why we could not use alcohol for manufacturing in retail drug stores and yet be using alcohol in the arts. That certainly is just as much in the meaning of the Act as the use of it in any of the arts.

THE CHAIRMAN: Would the gentleman say that pharmacy is an art?

PROF. REMINGTON: Pharmacy is an art and a profession.

MR. NATTANS: The point probably that Prof. Remington did not have in mind when he spoke is that while pharmacy may be an art, the practical question for the government will be how to provide the proper measures in a drug store to use free alcohol in that drug store. That is the point. I think it is impossible for the retailer to obtain the benefits that free alcohol would give him were he able to use it in his drug store. For the large manufacturer in the various arts requiring alcohol, the government will probably make provision. Now, then, if that be the case, the large manufacturer can certainly prepare things much cheaper than the retailer, for whom the government cannot provide, and he cannot therefore get the benefit of the free alcohol; cannot compete, in other words, and we will have the country flooded with goods at a lower rate than the retailer can manufacture them in his own shop. Consequently I think that rather than make that resolution read to commend, make it the reverse—we are opposed as retailers to free alcohol; we cannot make use of it; the government cannot provide the necessary machinery for us to use it, and we are, as a body of retailers, opposed to it, because we see in it a loop-hole by which we may be interfered with, if not worse. That is my position in regard to the alcohol question.

The Chairman: I think we would like to hear from some of our neighbors and others who know all about the use of alcohol in the arts.

Mr. Morrison: It seems to me the members who have spoken so far have failed to grasp the point Prof. Hallberg pointed out. As I read the section of this act, and as read by Prof. Hallberg, I do not see that the law provides for free alcohol, as we use alcohol. Now it says: "Alcohol for use for manufacture or in the arts;" to my mind there can be no question of course whatever about it, that if the government were to take off the excise duty on alcohol as it is to-day, and allow pure alcohol to be sent out without any excise duty, there can be no question about it, it would practically mean the ruination of the retail druggist. Because it is an utter impossibility, to quote Mr. Hallberg again, for political and economical reasons, it would be impossible for the government to keep track of the alcohol sent out and used by every retail druggist in the country, consequently the manufacture of articles containing alcohol would immediately fall into the hands of manufacturers. There can be no doubt about that whatever. All these advantages would be on the side of the wholesaler and manufacturer, and the retailer would have to buy by the gallon lot, have it examined and certified by the gallon, and would be practically driven out of the field. I think as the act reads at present there is nothing to prevent the government adopting the plan in use in Canada and Great Britain—that is, using methylated spirit. We have had for quite a number of years methylated spirits, that is alcohol containing 10 per cent. of methyl alcohol. Now, this methyl alcohol was added for the purpose of preventing its use as a beverage, or in any mixture intended for internal use. It could be used for such purposes as the making of spirit of camphor for certain liniments, and principally for burning or for making varnishes. Another thing in connection with that, was that the alcohol distillers used to prepare this, used to buy methyl alcohol from the government, add it to the ethyl alcohol, and send it out in that shape. The government found even with this 10 per cent. added it was being used as a beverage, and in order to stop that they have withdrawn the right to manufacture it from the distillers, and all the methylated spirit used in Canada is manufactured in Canada under the immediate supervision of the government. They now add 25 per cent. methyl alcohol, which mixture can be used for burning, for making varnishes, and for certain liniments. One druggist I know uses it in a liniment with tincture of iodine. The result is of course that in some quarters he has the reputation of making the strongest tincture of iodine in the country. As you are well aware, iodine forms a volatile compound, which acts upon the eyes something like the oil of mustard, and it caused people to think that he sells awfully strong tincture of iodine. I know of only one that does that. I see nothing to prevent the government adopting that plan. How do we know but what the government is elaborating such a plan as that? If that was adopted I don't think it would injure the retail druggist, but free wine spirit would be the ruination of the retail druggist.

Mr. Watson: In the discussion that has occurred so far, those who speak for manufacturers say they do not want free alcohol, and every one who has spoken for the retailers says they don't want free alcohol. If both sides are sincere it seems to me our duty is plain, to appoint a Committee to request Mr. Carlisle to make such regulations against it that nobody can use it—that we don't want it.

Mr. Ryan: I had no idea of opening up such a discussion when I made my brief remark on the resolution offered, but I want to say it is all superfluous, because there is no question in my mind whatever, that Congress when it meets in December will repeal this portion of the Tariff Act. It only passed by default, and senators who have been spoken to about it admit that the country cannot afford to take this tax off, neither can they afford to open up a door for fraud, which this tax does.

MR. HALLBERG: I only want to call the attention of Mr. Watson to this fact, that while this legislation has been engineered through by the wholesale druggist, it has had the aid of manufacturers. I will tell you why Section 61 was desirable on the free crude material principle. It was almost necessary from the standpoint of manufacturers of chemicals, as there is quite a large series of these chemicals in which alcohol is extensively used, on which the duty has been reduced under the Wilson-Gorman Tariff bill from about twenty to forty per cent., as near as I can remember. I have a copy of the Act with me; I read it the other day; I think it ranges from twenty to forty per cent. Now I can see every reason why Powers and Weightman, Mallinkrodt, not to speak of the other manufacturers, are in favor of free alcohol, so that they can make ether, collodion, iodoform, etc., and compete with the imported article, considering that the tariff has been so greatly reduced; and I think that class of manufacturers want free alcohol. I do not suppose that the manufacturer of fluid extracts wants free alcohol, because it would reduce the price, I am satisfied, on fluid extracts. Assuming, now, that the average price is to a retail druggist ninety cents, they would have to reduce the price of fluid extract down to an average price of about sixty cents or sixty-five cents. Now they are not going to sell much more fluid extract, probably they will not sell as much fluid extract because of this free alcohol, and they are not going to make as much money on selling at sixty-five cents, as they did at ninety cents. So I can see why manufacturing pharmacists would not favor this bill; and in fact while I hope it will be repealed at the next session, as Prof. Ryan says, we cannot take chances on that, and I believe it is perfectly proper that we should appoint a strong committee to watch this thing until it is repealed, so that whatever is done, we will not have our interests entirely lost sight of.

THE CHAIRMAN: I think I would like to hear from Mr. Mason. He knows a great deal about alcohol in arts and medicines, from the standpoint of the British Pharmacopœia and the British chemists.

MR. MASON: Mr. Chairman and gentlemen, my knowledge of this subject perhaps is not quite so great as I could wish; but as far as I can remember, there is no free alcohol in England. Foreign competition in tinctures and chloroform there is, and those things that are made in Germany compel manufacturers to make such overtures to the government that within the last two or three years they have permitted manufacturers of such goods to place in bond in their bonded warehouses, or rather they require a manufacturer to employ a sort of warehouse for the manufacture of his goods in this way, and the question was thoroughly gone into by the Chamber of Commerce there, and experiments were made in the government laboratories, and the losses of the manufacturer of these goods taken into account, and they had a rebate for the losses, and they are allowed to export the goods with this free alcohol, and they can take such manufactures out of bond and sell them in England, paying the duty of ten shillings and sixpence. In reference to methylated spirit, I think I can remember the time when that article was introduced. The idea was to invent a non-potable spirit. I don't think it was the Scotchmen who made use of it for this purpose, although it is true that a large quantity of this spirit was manufactured in Scotland, because the large distilleries are located about Edinburgh; but a man in England has made an enormous fortune out of this thing. He collected the methylated spirit, and sold it in pint bottles, until the government found him out. From that time, to render it less potable, something else was added. At the present time it contains 20 per cent of mineral matter added to the spirit. They have also increased the restrictions for the sale. At one time all the manufacture of methylated spirit was conducted under their immediate supervision, and the wholesale druggist could buy one or fifty gallons at a time. He had to send in a requisition for it, the requisition forms being supplied by the Board of Revenue. At that time he was allowed to sell to the retail druggist two gallons at one time. No man was allowed to be supplied more than two gallons at one time. There are ways of getting over that—a man who wanted ten gallons got ten invoices on different dates. At the present time I believe they are not allowed to sell methylated spirit to chemists. They even had to have a certificate for each of those two-gallon-holders for methylated spirit. By chemists I mean retail druggists. At the present time these restrictions are removed, and I believe that they are liable to prosecution for selling methylated spirit. At the same time they permit manufacturers to use it in separate warehouses, and they are allowed to use it in laboratories, and it is allowed to be used in the manufacture of liniments for external use only, and for veterinary purposes. If I remember rightly, Sir, up to the year 1887, this commission committed itself to the use of free alcohol, at least for a duty of 10 per cent. I think you will find in the market report for three or four years that this was commenced in 1887. In 1881 I wrote a market report, and I know the subject was mentioned and a recommendation of 10 per cent. only made. I think I was following in the footsteps of Mr. Kline, who recommended the same thing previously. I can say nothing further on this subject.

MR. MORRISON: I would like to make a suggestion. How would it do, now this discussion is on—how would it do for this Association to recommend to the government that it adopt some scheme, either methylation or the denaturalization of alcohol? This would be a way out of the trouble as to free alcohol, and give retailers a chance to use it.

MR. MASON: One form suggested in the way of getting over the difficulty was the adding of ammonia to the spirit, which was allowed, but by re-distillation that was soon gotten rid of.

THE CHAIRMAN: I guess the Chairman's method was the best of the three. Gentlemen, a suggestion has been made on the floor that the original motion might be tabled and the amendment found acceptable by the appointment of a Committee to act or to co-operate with the National Wholesale Druggists' Association at the proper time when this question of regulating the sale of alcohol takes place in Washington. Are you ready for the amendment? I will read the resolution and amendment:

Resolved, That it is the sense of the American Pharmaceutical Association that the action of the Congress of the United States in legislating for free alcohol in the arts is to be commended, and a Committee of three, of whom Dr. E. R. Squibb shall be one, be appointed by the Chair to co-operate with the Legislative Committee of the National Wholesale Druggists' Association to secure such legislation for free alcohol for use in medicine as will benefit the pharmacists. Are you ready for the amendment? The amendment was to lay that on the table.

PROF. GOOD: Does not Mr. Sheppard offer that as a substitute?

MR. SHEPPARD: I accepted that as an original motion.

PROF. GOOD: That is the original motion.

MR. NATTANS: I move to lay that on the table as read.

THE CHAIRMAN: I hope the gentleman will not insist on his motion, as there are remarks to be made.

MR. NATTANS: I withdraw my motion in order to permit remarks.

Mr. Whitney: The remarks made about methylated alcohol have interested me. In several cases under my observation I know a barrel of alcohol had been placed in the basement, and when a customer wants a quart of gin a pint of alcohol is taken and a quart of gin dispensed. Another person wants a pint of Jamaica rum, and half a pint of alcohol is drawn and a pint of rum is dispensed; and it is the same thing throughout the entire list. In addition to that, from my own knowledge and experience, the license commissioner recently appointed found in one town ten such stores. They claim it is deodorized spirit. I am happy to say that in the State of Massachusetts we have forbidden even a registered pharmacist to obtain the sixth-class license, unless he goes before the Board of Pharmacy and obtains a certificate certifying that he is a proper person to be intrusted with such license, and that the public good would be promoted thereby; and in trying to carry out this law we have prevented this fearful crime and this fearful nuisance, this pestilence stalking abroad under the name of Pharmacy. If I understand it, this Pharmaceutical Association is for the purpose of protecting educated pharmacists, helping and elevating the calling, and I protest solemnly against any action on the part of this Association that shall make the proportion of these vile places greater, but that they shall be squelched and squelched effectually, and no action on the part of this body should aid them in any manner.

Mr. Alpers: Mr. Chairman, I have attentively listened to the remarks that have been made, and I have as yet not found out what the Association would like to do. It is proposed that a committee shall be sent to Washington, but what the committee shall do there we do not know. It is stated the government does not know any way out of this dilemma. They do not know how to regulate the retailers who use alcohol, or how to detect frauds. We don't know either. The fact is that this committee goes to Washington, and all they can tell the Secretary is, "We came here to tell you that we don't know any more than you do; we cannot give you any advice; we don't know how to do this, because we know of no way any more than you do." Well, what is the use of sending your committee? If you want to send a committee you must instruct the committee what you want them to do. If it is the sense of this meeting that methylated alcohol shall be recommended, let the committee work in that direction; but to say we did not arrange any plan by which this could be done, and send a committee to convey this valuable knowledge to the Secretary, I think is wasting time and money. The idea of methylating alcohol for the arts, if that is an acceptable one, let us say so, and let us send a committee with that idea, that they will work in such a way as to give us methylated alcohol. I certainly cannot approve the resolution as it stands there, because in my mind it means nothing.

The question was then called for by several.

The question being on the motion of Mr. Nattans to lay the motion on the table, it was agreed to.

The Chairman: What is your further pleasure?

Mr. Hallberg: I suggest that a committee of three be appointed to report a resolution to the meeting to-morrow morning covering the question.

Prof. Good: I second that motion.

The Chairman: It has been moved and seconded that a committee of three be appointed to formulate a resolution bearing on this subject to be presented to the Section on Commercial Interests to-morrow morning.

Agreed to.

THE CHAIRMAN: Of how many shall that committee consist?

PROF. GOOD: Three.

THE CHAIRMAN: How shall the committee be appointed?

PROF. GOOD: By the Chair.

THE CHAIRMAN: I will appoint Mr. Dohme, Mr. Whitney and Mr. Hallberg, and I will make Mr. Hallberg Chairman of that Committee, as mover of the resolution. If there is no further business, a motion to adjourn is in order.

On motion of Prof. Good, the Section adjourned until to-morrow morning at ten o'clock.

SECOND SESSION.—WEDNESDAY MORNING, SEPTEMBER 5.

The session was called to order at 10 a. m. by the temporary Chairman, Geo. J. Seabury. The Secretary read the Minutes of the first session, which were upon motion approved. Mr. Seabury then addressed the meeting as follows:

Gentlemen: The absence of Mr. Rogers, who, I am informed, is under the weather, is to be regretted, as he undoubtedly would have presented an address. I will admit that his task would be one surrounded by difficulties, and to properly cover the ground would require some time. I intended to prepare a paper for this Section, but when I found that transpiring events were crowding pharmacy so fast into new conditions, I thought it would be far better for me to have been on the floor.

The object of this Section, as we all know, is the discussion of commercial problems and business grievances, and also to pay our respects to trade interests. Our commercial relations being the foundation-stone, no question is greater than the question of bread and butter. Consequently, our deliberations will be important. I will not weary you with protective plans, or recite past attempts to make the druggist's life a pleasant one. That is a matter of history, and so well known that it would be tiresome to rehearse the past. Within the present year an apparently new plan has been introduced into several States and communities. Those of you who read our journals will be posted as to the results of its work, and before this session is closed I shall call upon several gentlemen identified with the Interstate League movement for an explanation of its present status.

The protection which pharmacists have and which has worked great good is from association, especially when we have a fraternal regard for each other's interests. Protective movements have always been successful when large bodies have worked in unison. Dissension and indifference have always led to failure. You know very well that in cutting communities those members of our profession who have no faith in their brethren or themselves naturally believe in imitating the practices of commercial druggists as a matter of defence. Therefore it is a fact that this disastrous practice has come to stay, especially in large cities.

From a commercial standpoint, the conditions of the drug trade are undergoing a revolution. The war is at our doors. The question in my mind is, Will it continue? The answer depends entirely on the aggressiveness of organized pharmacy in this country. We have for many years past discovered that a small proportion of our natural distributors are not our natural protectors, and have no faith or interest in trade ethics.

Another question which confronts us is the relation of the physician to the pharmacist.

On the decision depends the future of pharmacy. The solution of this question is also in your hands. Those who look on the commercial branch of pharmacy to properly adjudicate the relation will have no difficulty to find where it begins and ends. Over competition among manufacturing pharmacists has already led us into a new commercial situation, which is forging a strong chain between physicians and themselves. I speak more particularly now of the so-called ready-made formulary, and of materials of all kinds, that several enterprising manufacturing pharmacists are supplying physicians direct. That question, gentlemen, must be settled by you within the next two years, or the evil has come to stay. I do not array all manufacturing pharmacists, because some of us still have a little love left for our brethren and their trade interests.

A member who passes most of his time in the Scientific Section, uttered these sentiments as I passed by him, "Pharmacy is no longer a profession. We are fast becoming pure and simple traders." Naturally such remarks created surprise, as they came from a prominent professor of pharmacy. He finished up his views by asking, "Of what use is the Commercial Section anyhow?" I replied, "During the past ten years we have accomplished a great deal of good among ourselves by uniting for our own interests, if for nothing else, especially on trade questions." Then I said to him, "Of what use is the Scientific Section at the present time? Instead of reading papers on theoretical, pharmaceutical or chemical problems, or what we know about *riptate* of potassium, why do they not turn their attention to the ordinary puzzling questions of the day. Why do they not solve some of the practical, every-day problems that druggists are obliged to contend with?—for instance, how to permanently preserve our syrups and ointments—and also to unravel some of the more intricate chemical conundrums." (Applause.)

I hold that nearly every professor or representative pharmacist in the United States, especially those interested in educational work, should look our business questions straight in the face, inasmuch as such questions revolving around our mortars mean existence, and are serious questions on that account. In view of this fact, what is to become of us, surrounded as we are with conflicting changes? That is a matter for you to decide. I have simply presented to you our new relations to the physician, and his present relations to the manufacturing pharmacist, and our relations to both. If the physician turns a cold, unsympathetic ear to our entreaties when we ask him to carry out the functions of his profession, and he insists on dispensing his own remedies, then we must defend ourselves in our own way. Understand me, pharmacists will not complain of self-dispensing allopathic physicians who live in remote sections where a druggist cannot exist, but I am confining my remarks to localities where hundreds of druggists can be found within a mile—in other words, accessible communities, where an excuse cannot be offered by the physician for ignoring the druggist.

Now that I have submitted to you a review of the situation, I will also offer the remedy, and that remedy consists in our adding a medical annex to our colleges of pharmacy throughout the United States. I do not believe in counter prescribing, but the fact remains that if the physician will not listen to the claims of our profession, then we must apply the remedy, "Similia similibus curantur." (Applause.)

Gentlemen, the meeting is now at your disposal, and the Chair will listen to any remarks that are on the general subject. In the absence of volunteers without being encouraged, I would ask if there is anybody present that has been identified in the Interstate League work in the past year? We would like to hear from them what they have accomplished, what obstacles they have found in their pathway, etc., as a matter of information for the members of the Section.

MR. ELIEL: Mr. Chairmain, if Mr. Sloan of Indianapolis is present, I think he ought to give us some points on that.

MR. SLOAN: Mr. Chairman, I have had no connection with the Interstate League within the last year. Mr. Ebert probably can make some statement about it.

MR. EBERT: Mr. Chairman, I want to say as far as the West is concerned, we have a great deal to do with it; we have contributed our money as in Chicago, and we have not seen a cent of it, and never have had any benefit of it. That is one of the items of it. We have come together and have wasted our time, and that is just all there is to it. Those who usually come spend their time and sit around, do lots of talking as to how they are going to benefit the drug trade, how they are going to get the trade together, and when it comes to acting there is nothing to it. That is the way we have been going in the West.

MR. SLOAN: I am told that Mr. Layton, who was an inspector of the Interstate League, gave it for three years his entire attention, and I saw a notice that he has gone over to the cutters.

MR. ALEXANDER: Allow me to say one word in regard to Mr. Layton. Mr. Layton was one of the prime movers in the Interstate League, and the statement that he has joined the cutters is a fact. To a certain extent he is forced into it, sir: he cannot stand alone in St. Louis with men all around him selling patent medicines and he holding his prices up to the full schedule. That is simply a matter not of his own volition, but a matter forced upon him, the same as it was with myself. I think I was one of the original members of the Interstate League, and helped to form it, and stood a long time with it, while the cutters were all around me, holding up to my schedule prices, and, gentlemen, what was the result? I had the pleasure of seeing my neighbors sell to customers I refused, and seeing the customers walk out every day. I was not able to stand that, and I had to meet the prices, and that is the case with my friend, Mr. Layton. I do not wish to have any aspersions thrown upon him in regard to his work. He has been more devoted to it, has given more time to it, and more money to it, than any man in the United States. (Applause).

MR. EBERT: I would like to say just this one thing. Mr. Alexander presents to us a simple fact; why shall we go here and go there? We started the league in good faith, in Chicago, and collected some seven hundred dollars, but nothing came of it. Why shall we go over the ground again of selling patent medicines, and the holding of the prices up to the full schedule? This every one knows; I do not get full prices, and if I try to do it, I starve.

MR. BUTLER: This movement of the Interstate League started out west and has been transferred; a good part of it seems to have gone east. Now I can say I am sorry that Mr. Canning is not here to speak for the Interstate League, as he is the President. He has accomplished, with a few of his agencies, through Messrs Cobb and several others, in Boston, a good work in our section; it has been done by organization—the organization of small associations or small leagues in the separate towns; and he has accomplished a great deal of good in our section, and it is growing, and we are seeing the advantages there in our city of Lowell through the effort of Mr. Canning and one or two of his lieutenants who came there. The most we thought of getting was sixty-seven cents for a dollar preparation, and we made a uniform rule, except some, and now we get one dollar for such preparations; and for those things that cost two dollars a dozen we get twenty-five cents, the full price; and really for the small sum we pay out for the carrying on of this League, we are getting a good percentage on our money. In that way we are extending and extending from town to town in New England, and the League is certainly accomplishing a great deal of good, it seems to me, for the energy that is put into it. Two or three men in the State, if we could find those public-spirited men, would accomplish a great deal of good through this Interstate League.

MR. HALLBERG: The statement has been made that the merchants of Chicago had contributed $700 to the Interstate League, and were deriving no benefit; I hope that Mr. Ebert will qualify that statement.

MR. EBERT: In what way?

MR. HALLBERG: By reducing the amount to $150. (Laughter.)

MR. EBERT: I beg your pardon; I want to say right here that it is not so, that at the present time after all expenses we are still in the hands of that gentlemen who was a Committeeman; it is only one hundred dollars, and I want to say that that is not subject to a suit in court. If you wish to know how much money we contributed—

MR. HALLBERG: He is not a member of the organization, and knows nothing about it.

THE CHAIRMAN: Mr. Hallberg has the floor, and we will let him defend himself.

MR. HALLBERG: I think Mr. Ebert will agree to this qualification, that while the druggists of Chicago may have expended seven hundred dollars, the greater portion of that was for that Hayes plan and not the Interstate League.

MR. EBERT: It was by calling a meeting and—

THE CHAIRMAN: Mr. Hallberg has the floor.

MR. EBERT: I am answering his questions. I know what I am talking about; I was one of the Committee.

MR. HALLBERG: We will let that go. The simple point I want to make is this; and I may say right at the outset, that I would not speak on this question at all if it was not for the fact that the journals have seen fit to castigate those connected with colleges because they don't take any interest in this question. The Chairman here has just castigated the members of this Association who happen to be actually acquainted with some college because they don't take any interest in this question. Now, I never have been used to castigation, and don't propose to take any this morning. I want to say something on this question. The consensus of opinion of nearly every man that has observed the working of the commercial blight over the druggists is to the effect that local societies and organizations of druggists can in very many instances do a great deal of good. We know that as a positive fact; we know what we have done; we know what has been done in different sections of Massachusetts; we know what we have done in Louisville, where a club has for the last three or four years kept all the druggists of that city together as one man. Now, in that direction the Interstate League plan and platform is doing a very good work. That it does not always work or does not continue to have its good work, in the larger cities, such as St. Louis, and if I may be permitted, I will include Chicago, does not alter the fact that it is valuable. It is a difficult thing to organize eight or nine hundred drug stores in the city of New York; I believe it is impossible, just as it is almost impossible to organize the seven hundred and fifty drug stores in the city of Chicago; but the Interstate League, or the fact of it still being a sort of society in Chicago, has, notwithstanding, brought the druggists more closely together; and it is a fact that cutting in Chicago is confined to the druggists doing business in the northern half of the first ward, which comprises not more than about twenty stores, with an occasional offshoot in some populous district in the suburbs; but the great mass of the druggists of Chicago are not cutting.

It shows what can be done by local associations, and if the local society chooses an officer who collects the money and does not account for it properly, that is the fault of the local secretary or of the local society, and I don't see what that qnestion has got to do with this greater question before the State Association. Now, as I have stated, I have followed the reports on this question before the various State Associations during this summer; they hold up, every one of them, first your local society as the thing for the druggists to cultivate and support. I will simply close by pointing out what Patton, of the Illinois Association, brought out three weeks ago: he said that he believed that the patent medicines could be best superseded and this question brought nearer solution by the druggists forming a company among themselves, on a large scale, for the manufacture and sale of a line of domestic remedies, made and sold in the name of the Association—the company to be organized of five hundred members, the preparations to be protected by copyright and trade mark. That was unanimously approved by the Illinois Association, and a committee has been instructed to formulate a plan during the coming year.

MR. DADD: I would say I have been largely identified with this Association in relation to the cutting on patent medicines, and I have come to the conclusion that they amount to nil. The true course for reaching this question properly, I think, would be in the pharmacist himself. The last observation of our friend Mr. Hallberg, I could not endorse; it makes pharmacists very small men, lowering the standard down to a standard a little above patent medicine men. The true solution in my opinion is for each pharmacist to prepare preparations of his own, with his own name attached for the use of the public at large, and not to transcend or go beyond the legitimate idea of getting medicines for the proper purposes. If you go into the mass of remedies stating they will cure all known diseases on this earth, you will become at once charlatans: on that ground I should oppose the idea in toto. There is a point upon which every pharmacist can work, and work legitimately; it is by at all times bringing the relations between the physicians and pharmacists closer and closer, and he can do that by holding his own profession up and by raising the respect of the physicians by his actions, and never degrading his own profession. We are surrounded by evils in the present day so great, that it is no wonder that it should be stated that pharmacy had run out. He is discouraged I know, badly, but it has not run out; it has run down, but not out. It lies with a few of us who have always stood by the right person to bring it up again; and gentlemen, although I am a man of advanced years, we will do it yet, if men will hold to the ethical conditions that surround their profession as they should, and we can hold the fort at all times. We are invited by the special preparations put out by houses to go into this trade, and I think they are the greatest dangers we possess; but we can by our personal interest so limit their sale, and so effectually run them out as to bring into our trade persons whom we had two years ago—the physicians that we can control, because they are being surrounded with these preparations, which are supposed to be the greatest thing of the day. They are like everything else, they are a fad; they are things that will have their day, but will pass away. I heard Dr. Woodbury, who was the President of the Section on Pharmacy of the American Medical Association, read a paper on that myself, and he intimated and pointed out that that thing would pass away among other things as men became educated, and as physicians were early educated. Physicians at heart, they will depart from all those things. They will not allow an agent to come into their office, and say to them, "Here is something that I will sell you, it is good for so and so." Their reply to him will be: "You are insulting me, leave this office. If I am too ignorant to formulate a prescription for my patient, I am not fit for a physician"—and that is so. (Applause.)

Now again in regard to colleges in relation to pharmacy, and what they shall do. I have had something to do with colleges, and I have at the present time one under my charge, which belongs to the University of Wisconsin. What the college has to do is to select the individual out of which to make the pharmacist. It makes a standard of education by which these young men are to be brought up, and says if they are not sufficiently educated we will not receive them. If they have not sufficient intelligence they are thrown out, and only those taken that are fitted by intelligence and education. Consequently there is a better selection of men to bring forward as pharmacists, and in the future they will hold up the standard of pharmacy. The trouble is in the State. For thirty years we have had men in the pharmaceutical profession, possibly more in the West than elsewhere, who were never fitted for it properly, never educated, never had an ethical idea in following that profession. I have passed through, from 1850 up to the present time, all that, and I am here to-day holding my position as a pharmacist, doing a good business on the basis of holding up the ethics of pharmacy, and not faltering. While I sell patent medicines, I never endorse one. I do not think we ought to go into the manufacture of patent medicines or to recognize them; we ought to fight them and kill them off as vipers. We have no trouble in our State Association with regard to cutting prices, and all through the towns of the State there is no cutting. When you get in the larger cities like Milwaukee or Chicago, there is not enough unanimity among those in the business, and each man is striving to obtain a livelihood, and he lets go. It is a question of the big fish trying to swallow the little fish, and prices are forced down and the little men cannot live. It is selfishness and the small man has no protection; he is being doubled up, and though the local Association may answer in the small places it has no standing in the big city. A man must carry on his business according to his perceptions of it, which are governed by what he will get, and the small man in order to live and protect himself has got to do it. I do not know that I can say anything more in relation to that on general principles. That is all. If there is anything further, I have overlooked it. I don't think any of these Associations banding together for standard prices will answer in large cities. They may do in small places; they cannot be maintained in large cities. My business place is surrounded with cutters' stores, and I take no notice of them, but go on with my own business, and in that way I live and will live. I will live by using my business capacity to hold myself up, and to meet that cutting when it comes, even to the death. That is the way we have all got to do. There is no special arrangement; we have to look ai the environment and conditions openly. Chicago may be different from Milwaukee, Milwaukee different from Madison, or Boston, or any other place. Each body in the State must make arrangements and suit itself to the surrounding conditions. (Applause.)

Mr. Sawyer: Mr. President, I would like to endorse some remarks made by Mr. Butler, in regard to what the Interstate League has done. For instance, in the State of Massachussetts, Worcester was a thorough cutting place; every man was trying to cut his neighbor's throat, and the result was the State Association took hold of the Interstate League, appointed a committee, went to the various cities, also furnished that committee with money to work with; visited various cities and brought about a reform in those cities; and in Lowell, Springfield and Worcester they have been successful. Now the last two gentlemen spoke in regard to the large cities, and I say this, I believe the Interstate League can be made a success, but you do not want to go in, as if it was an army sending in one division, having them cut down, and then sending another and having them cut down, but you want all to go at once. The druggists in every large city should be organized. If you could get 80 per cent. of the men to sign this blank and become members of the Interstate League, and then unite you can make a success of it. So long as you carry on a guerilla warfare, you never can do it; it must be by your united strength. You know that united you can succeed every time. When you come to that, nothing succeeds like success. I do believe if the druggists in the cities would unite in organization and hold themselves in readiness at all proper times, they would be successful. There is not the slightest doubt in my mind in regard to that. The whole trouble has been in this business from the very fact that every man has run on his own basis, and the old saying is true, every tub on its own bottom does not stand a great while, and you can soon make cutters come round and knock them out. I hope this Interstate League will not be a failure. In the city of Boston we have not reaped any benefft from it at the present time. We are holding our organization from this point so that the great cities of Chicago, Cincinnati, New York and Philadelphia, can get the beneft of the Interstate League. If these conditions are followed out I believe the Interstate League can be made a success. I don't see any reason for crying baby, and lying down at the present time. I was somewhat surprised on hearing Mr. Ebert say that Illinois had fallen through, where the foundation of the Interstate League was laid.

MR. DADD: Excuse me, gentlemen, but this gentleman from Massachusetts is speaking with reference to the East and West, where different conditions prevail. The East is certainly a part of the Union a little more conservative, and can be more relied on. We have tried those methods in the larger cities; we have tried them in Milwaukee. I have been at the head of it for the last eight years, and in that thing we find though the majority have and do follow out the agreement, keeping up the prices, there are certain individuals in the community, who taking advantage of the agreement for their own selfish ends will nigg, and it is found that that demoralizes the whole thing; it is thus, gentlemen, they break the compact and destroy the whole thing. In the East the League is conducted on different principles, and no comparison between the East and West can be made. Western civilization is on a different plan, different people with different ideas—what are called progressive ideas, and the progressive ideas are such that they knock out all old-fashioned principles. They have new principles which they are seeking to work out; whether they succeed or not is the question. Boston is the hub and its spokes have not reached us yet, but we have to work out our conditions as they present themselves. The Interstate League does not succeed in the West, and will not succeed until the character of the people changes, and then it may succeed. At the present it is not a success, and will not prove a success, because the conditions are not the same.

MR. ALEXANDER: I think our friend, Mr. Sawyer, of Boston, has struck the key-note. The Interstate League has got to get more than 80 per cent., because the other 20 per cent. can knock the Interstate League into a cocked hat; but that does not militate against the Interstate League a particle; what we want to do is to organize, and when we get 80 per cent. of the druggists of the United States organized, then we have the manufacturers and the wholesale merchants right in our own hands, and we can prevent their getting goods from any point. The thing to do is to organize—organize in every place. Stand quietly together and bear this thing a year or two longer. I do not despair at all of the Interstate League, and never have. I only know it has to be suspended for the time being, and the time will come when we all shall be organized throughout the country, and then we can say to these manufacturers, as the Interstate League says, "Protect your customers, or we will throw your goods out," and that is the only plan. The Interstate League is all right.

MR. SAWYER: I agree with that.

MR. HALLBERG: I would like to call the attention of the Section to the by-laws, which provide that no member shall be allowed to speak twice on the same subject, except by unanimous consent, until every other member who desires to speak has had a chance to speak.

THE CHAIRMAN: That is the rule, and I think the matter is well settled, and the Chair is cognizant of that fact; but when I found that some were diffident in the beginning, I don't believe it is a crime to be a little blind in one eye to the by-laws; I think the course we should take is the limit of five minutes, and no more, until the most of us get through talking, and then we will start afresh again, and will commence next week. Mr. Sawyer will have the floor if he has anything to say.

MR. SAWYER: I have nothing more to say, except that Mr. Alexander covered the point pretty well that I was going to speak upon. We have in the New England States every county and all the States organized, and furthermore in Boston 90 per cent. of the druggists are in the League.

MR. BUTLER: I do not wish to take the time, but Mr. Alexander's remark that 20 per cent. could control the 80 per cent. is very significant. In our section we have this understood, and we are not obliged to get full prices, but get enough to carry the control of the business. If this 20 per cent. will not meet us, we will meet them and crush them out, and we can do it.

MR. ELIEL: Mr. Chairman, I had not intended to say a word on this question, but after the very hearty endorsement of the Interstate League by our friends from Massachusetts, I cannot help congratulating them, and understand, in congratulating them we are congratulating ourselves; they have completely swept around the circle of our New England friends. At the meeting at Washington in 1883, at the time of the organization of the National Retail Organization, it was my good fortune to present the plan which is now known as the plan of the Interstate League, and but for the persistent antagonism of our New England friends, that plan would have been adopted at that time, and this question which has come up repeatedly at every meeting since that time would simply be ancient history. It does seem to me, Mr. Chairman, that we have not progressed one step since that great and enthusiastic meeting. We come here and talk trash, resolve to do things, and go home and do nothing.

It is a well conceded fact that local organization is the only method by which matters pertaining to our own business in the way of cutting prices and other similar questions may be settled. I do not believe that it is possible for us by any resolutions or anything of the kind to carry anything into effect. We have no national organization except in Maine. We have no strength, we are but a small percentage of the best druggists in the United States, and we are the only organization of this kind. We have for so many years endeavored to organize—we have talked of it and have thrashed over a great deal of straw under this head—but so far we have no organization. The brick-maker has an organization and he carries his point, and why cannot we have it? Now, Mr. Chairman, I take it that the platform of the Interstate League is a very simple one; it is one which we can carry out, and which, if we use our influence in our immediate surroundings, we can enforce without any trouble; but the question is will we do it? Now I have had some experience in this matter, and the fault does not lie with us as it does with the manufacturers both of the pharmaceutical and proprietary preparations. I know this for a fact, it is true at the time the Campion plan was inaugurated our Eastern jobbers said that this plan, which was a very good one by the way, and which was fairly successful, was vitiated by the action of some of the retail members of the East who would supply the people. I really think that the majority of those who went into the Campion plan did that only as an excuse to separate their connection with it. Our remedy, I take it, lies with ourselves. If we know the jobber will sell to the cutter, let us drop him. If we know the manufacturer will do things which we consider are unethical, unbusiness like, we must drop him. I do it in my business, and why cannot we all do it?

There is a point in view, I think I have spoken of it before, but do not know whether it was before this Association. I have brothers connected with large jobbing houses in the Northwest; cutting prices was maintained in the general stores for years. They have persistently refused to sell them anything, although knowing that they were able to obtain goods in the Chicago market, in the Peoria market and elsewhere, and had no trouble in getting all the goods they wanted—proprietary goods for their establishment. A friend of one of my brothers was trying to induce him to sell him goods; the argument was that he might as well sell the goods as to send his money to Chicago or elsewhere. After a good deal of hesitation, and after refusing him for ten years, he finally concluded he would try it. He told him he did not want him to sneak his wagon around to the back door, but when he wanted any goods to drive his wagon up to the front door, and he would supply him. It created a great commotion in the city at first, but when the retailers took in the situation they fell into it with good grace, and they came to the same conclusion that my brother did—they concluded they might as well get the business if it could not be stopped. It lies with us to a great extent to force these jobbers and manufacturers to mend their ways. Now, in the City of Chicago, and undoubtedly through the large commericial centres, there are large jobbers who will sell to cutters, asking no questions. These people can be found out: let us find them out, and when known, let us do no business with these people, let us freeze them down.

MR. MASON: I think it would be a matter of interest if Mr. Eliel would tell us where he obtains his supplies?

THE CHAIRMAN: The Chair does not care very much to have members interject questions.

MR. ELIEL: I can answer that question, but that question is hardly before us, and it would hardly be fair. If it is the desire or wish of the Association to know the jobbers and the manufacturers who supply the cutters direct, I think the Association can very easily find this out.

THE CHAIRMAN: I think that the question is one that is very apropos at the proper time. That is what we are here for. I don't think it is a crime to divulge these names.

MR. HALLBERG: At this point I would suggest that the names of manufacturers and wholesalers that sell to cutters be not named, but the ones that will refuse to sell to cutters be named.

MR. EBERT: Of these there are not any (laughter).

THE CHAIRMAN: Gentlemen I am very glad that the number of orators seems to be increasing—that will give me something to do.

MR. WHITNEY: I would like to know the question before the House?

THE CHAIRMAN: It is a general question on trade interest only.

MR. WHITNEY: We are to vote on what are trade ethics.

TRE CHAIRMAN: Anything not collateral to the matter will be overruled by the Chairman. (Laughter.)

MR. NATTANS: MR. Chairman—

THE CHAIRMAN: The gentleman is out of order, and the other gentleman has the floor.

MR. WHITNEY: You will have to give me some time to gather my thoughts—in taking such a broad scope, the whole earth it seems to me, if I understand, from the discussion going on, the question narrows itself down to this—shall the efforts of the Interstate League continue, or shall they stop; is that about the substance of it?

THE CHAIRMAN: There have been two sides to the question—the West denies that it is a success, and the East says it is.

ME. ALEXANDER: I beg your pardon, Mr. Chairman, the West says nothing of the kind—Chicago is not the West. (Laughter.)

THE CHAIRMAN: I have only spoken for the majority of the speakers, and Mr. Alexander is not included. (Laughter.)

MR. WHITNEY: Mr. Chairman and gentlemen of the Association, I think it is pretty good ethics and pretty good common sense to get something better than what you are using before you discard what you are trying. Now, if there is no better plan to present than the Interstate League, which is now a young child, and on trial, why strangle it? Give it a chance to grow and expand. The sun rises in the East, and as the Interstate League has risen in the East, give it a chance to settle in the West, and when you have given it a fair trial, and it has proven a failure, then strangle it with something better, but until you have got something better than the Bible, let the Bible prevail. When you have got a new thing to produce, and you know the fact and have tried a better or proven that the old has gone by, then it is time to start with something fresh; but I pray you, gentlemen, in the name of good ethics, in the name of honest work for the pharmacists of this country, if there are gentlemen who are sanguine and certain that by united efforts the Interstate League is our remedy, give them a chance to work it out, and don't come here and wrangle over nothing. I say, Mr. Chairman, that the time has come to stop fighting over small matters, and unless you have something better to present, give this a chance and prove the result, and not strangle it—it is not fair, it is not honest, it is not kind, and it certainly is belittling every time.

MR. EBERT: I rise to a point of order.

THE CHAIRMAN; If it is well taken, we will let you stand on it.

MR. EBERT: I would like to know what relation the Commercial Section has to the Interstate League?

THE CHAIRMAN: The Chair would rule it is a question germane; they are just as intimate as sister and brother, and the gentleman is out of order. Mr. Good has the floor.

PROF. GOOD: I rise for the purpose of presenting something in the form of a motion that we may act on and consider, as to the subject before us yesterday, and I move—I will give you the sense of it, I have not formulated the motion, but I will make a motion something to this effect—that it is the sense of the Commercial Section that the plan, that is the platform of the Interstate Retail Druggists' League is the proper one for us to operate upon—that is the idea.

THE CHAIRMAN: In the absence of something better?

PROF. GOOD: No—that for the present we consider the plan of the Interstate League is in the estimation of the Commercial Section of the American Pharmaceutical Association, the proper one under which we should operate.

MR. EBERT: I second that motion.

MR. DADD: May I move an amendment?

THE CHAIRMAN: Yes, sir.

MR. DADD: He says it is the proper one.

THE CHAIR: Let us get the origiual resolution first.

MR. ALEXANDER: I wish Mr. Good would amend that resolution and simplify it to some extent by saying this, that the Commercial Section of the American Pharmaceutical Association endorses the plan of the Interstate League.

PROF. GOOD: I accept that amendment.

MR. EBERT: I second that amendment.

THE CHAIRMAN: Does Mr. Dadd wish to make an amendment?—I merely say we can call it what we like—which is the proper one is perhaps a question of opinion. The one we have at present we could not say is the proper one—I think that implies saying too much for it.

The question was then called for and stated to be on the amendment offered by Mr. Alexander, and accepted by Mr. Good, that the Commercial Section of the American Pharmaceutical Association endorses the plan of the Interstate League.

A member inquired, what was that plan?

THE CHAIRMAN: It is going to take an hour to tell that—I don't think we want to go into a declaration of principles.

A MEMBER: If we are going to adopt a plan, we want to know what it is.

THE CHAIRMAN: As a declaration of principles—we hereby agree to withdraw our patronage from any wholesale dealers or jobbers, who knowingly and wilfully furnish cutters with any merchandise whatever. We also consent to discontinue the sale of any patent or proprietary article furnished to cutters by manufacturers or their agents.

A MEMBER: Am I to understand that covers the platform?

THE CHAIRMAN: Yes, sir, but I hope the members will put their names on record for anything of that kind.

MR. WATSON: I would like to ask some gentleman who is familiar with the plan—that says that every jobber must pledge himself not to sell to cutters—in Chicago and in large cities whese there are so many cutters, are they included in that?

MR. EBERT: Yes, sir.

MR. WATSON: It is not meant for the 80 per cent. who can agree to this plan that they must sit still and let the other 20 per cent. take all their business, or else the jobber must refuse to sell them.

MR. HALLBERG: I would like to offer one explanation on that. Now that is the declaration of principles of the Interstate League. If this Association wants to adopt those principles, they are not binding on any member of this Association until he becomes a member of a local branch of this Interstate League in some particular section, and not until then does he subscribe to this declaration of principles; therefore the action of this Section, it seems to me, is simply to suggest to the druggists of the country that this plan of the Interstate League is the best plan at the present time.

THE CHAIRMAN: Gentlemen, we all understand that this is the Constitution of the Interstate League—that goes without saying, and it certainly will not be a criminal offence if we endorse their work. Now Mr. Nattans, I will give you the floor.

MR. NATTENS: I only wanted something before the House.

THE CHAIRMAN: There is always something when you are here (applause). Is there any further discussion on this question? If not, the Chair will put the question.

MR. HALLBERG: There are several persons here who are known throughout the Western country as being pioneers in cutting, and it seems to me inasmuch as the gentlemen have taken sufficient interest in this subject to be here all this morning listening to what is going on, we ought to hear their side of the question. If Mr. Nattans will not speak, let us hear from Mr. Robinson, of Tennessee, or Mr. Jacobs, of Atlanta, Ga.

THE CHAIRMAN: The Chair would state that this Section has always been liberal, and always been generous in the treatment of this question, and any man, any person present, who is a member of the American Pharmaceutical Association, who will represent the other side of the question, we shall be glad to listen to collectively or singly. Now gentlemen, you have your opportunity.

MR. ROBINSON: Mr. President, I have not a word to say; I am a cutter, and I propose with your consent to conduct my own business in my own way, when I pay a hundred cents on a dollar for my goods, and sell them for just what I please.

MR. JACOBS: Mr. Chairman, I would like to ask a question as to what constitutes a cutter. Is it the man who gets sixty-seven cents on the dollar, or the man who gets seventy-five cents, or are we all to be classed as cutters? Where do you get a dollar for a dollar preparation? I don't know of any place in the Union where we get it.

THE CHAIRMAN: The Chair will answer that question by stating that it is a casuistical question—that is the answer.

MR. CHALIN: Three years ago, and at the White Mountains, our friend Mr. Finlay boasted of there being no cutters in New Orleans. To-day I am here regretting most exceedingly that it is not so. We have to-day cutters of the very worst type, and I come here to-day to make a suggestion. I don't think we can eradicate cutters as easily as we talk about it. I would suggest that the prices of patent medicine be raised to such a figure that the cutter cannot go on. The patent medicine man is the one who creates the demand, invests his money, and we are the distributors, and we have been doing this work for nothing right along, and I think we can do it for the patent medicine man. (Applause.)

The question being on the motion, it was agreed to.

MR. NATTANS: I would like to hear from the Committee appointed at the last session of this Section.

THE CHAIRMAN: That is a matter, Mr. Nattans, that will come up directly if we have no further business on these collateral questions. The business question seems to be disposed of, and I presume that the Section is unwilling to put itself on record on any of the points which have been brought to its notice to-day, and perhaps it would be a great deal better to allow these other questions to remain for twelve months more; in the meantime we will have a report from the Committee appointed on the question of free alcohol, and I ask your attention to this report.

Mr. Hallberg then read the following report:

The American Pharmaceutical Association at its Forty-second Annual Meeting, now being held at Asheville, N. C., having carefully considered the recent action of Congress in enacting legislation exempting alcohol used "in the arts, or in medicinal or like compounds," from internal revenue tax, as prescribed by Sec. 61 of "An Act to reduce taxation," etc., known as "The Tariff Bill" of the last Congress, and being convinced of the impossibility of regulating and controlling the use of alcohol in the broad sense in which such exemption might be construed, therefore earnestly and unitedly protest against any interpretation of such section, except as follows, to wit:

That the payment of rebate on the internal revenue tax on alcohol under Sec. 61 of said act be confined to alcohol used in the manufacture of those products in which the alcohol used is so changed as to lose absolutely its chemical and physical properties, including the classes of chemical compounds, known as the ethers, chloral and chloroform.

C. S. N. Hallberg,
H. M. Whitney,
Charles E. Dohme.

The Chairman: Gentlemen, you have heard the report. What is your pleasure? For the information of the members, I would state that this question was brought up here yesterday afternoon, and was generally debated by the members present. I will not say exhaustively, but at least to such an extent as to warrant us to have appointed a committee of at least three to represent the American Pharmaceutical Association when the Secretary or the Treasury is ready to make regulations of the admission of free alcohol for use in medicines. Now I think that is about the thing we can do. We went over this ground quite exhaustively, in a cursory way, and in the absence of any data from the government, we were simply, I might say, in the dark; we cannot act until they give us rules and regulations on this point.

Mr. Sheppard: As I interpret this report just read, it puts it in a few words, and to bring it before the House I move that the report be received.

Agreed to.

Mr. Hallberg: Mr. Chairman, I think if now some member of the committee would give a very brief synopsis of what led the committee to formulate this resolution in that way, it might expedite matters very much. Under the terms of the section as you remember it reads—"alcohol used in the arts, in medicine and other like compounds." That resolves the question first into the proposition: "used in the arts," that is very broad. Alcohol related to pharmacy may be said to have three uses. First, as an ingredient as well as a solvent in a great many medicines, to be used both internally and externally. The committee are unanimous on the point that alcohol that is used by the druggists or by anybody else in any medicinal compouud, or in anything to be used medicinally, should not be made free of tax; that it would subject the druggists of the country to all sorts of prejudices and all that sort of thing, as related yesterday. Then the next proposition was, alcohol as a solvent, both in the arts, in the industries proper, and in manufacturing pharmacy. This may be divided into two classes; alcohol purely as a solvent in the case of varnishes, cements and preparations of that kind, and alcohol to be used for the extraction of drugs and in the manufacture of chemicals and products of that character in which the alcohol is only used as a solvent, regained by distillation. After carefully considering this question it was decided that it would be a practical impossibility for the government to make any regulations which would confine the use of alcohol to its legitimate channels. In the case for example of the manufacturing pharmacist who makes fluid extract, solid extracts, and resinoids: in the case of solid extracts he would have alcohol free from tax because there was no alcohol in the finished compound; on the other hand, he has been making a large variety of preparations and fluid extracts, etc. The committee thought the government was not in a position to formulate any rules by which they could keep track of alcohol used in the general pharmaceutical establishments. I was also personally informed afterwards by a manufacturer that such a manufacturer would not find it to any advantage; that for example, in the manufacture of the solid extracts and resinoids, a careful manufacturer does not lose five per cent. of the alcohol by evaporation—he regains it all; consequently it does not make much difference whether he pays the tax or not, he could not distinguish between the alcohol used in the menstruum and that in the fluid extracts and tinctures. Now then what is left ? There is a class of chemical compounds in which alcohol is used, where it is decomposed and changed into other compounds as in the manufacture of the ethers, chloral and chloroform; they are by far the most important. Now those substances are largely imported into this country as you know. Chloral and chloroform, especially, free alcohol will enable the manufacturing chemists of the United States to produce those compounds probably as cheaply as they can be imported from Germany, and other foreign countries, and that would be under those circumstances a proper thing for us to do, to stimulate our home industry. The committee was entirely unanimous on this question, and went over the ground as carefully as it could, and we believe it to be for the best interests of the Association to take no stand further than what we know to be absolutely safe.

MR. SHEPPARD: This Association is practically an Association of retail druggists, and 90 per cent. of our members are retailers. To sum up the report of this committee, it is this—"Please do not try to give us free alcohol." Now I do not claim to have knowledge enough of this general subject to be able to answer this question as to whether the Secretary of the Treasury can make rules which are strict and binding, but I do question very much the desirability of an Association of retailers sending in a request to the Secretary—"Please do not give us free alcohol." I do not propose to make any speech on the subject, but that is the way the question presents itself to me, as being rather a strange thing for this Association of retailers to ask not to have free alcohol, if by any possible way the Secretary of the Treasury could give it to them.

MR. GOOD: The question raised in Mr. Sheppard's mind was fully and freely and exhaustively discussed yesterday; in short, we came to the conclusion to our own satisfaction that while we have been asking for free alcohol so long, we did get an answer which gave us more than we could manage. What we would like to have would be as much benefit out of this as possible, and the benefit we would get out of it would be from the cheaper products which it is contended all must buy. I do not ask for free alcohol for the manufacture of fluid extracts, for the manufacture of the resinoids, for the manufacture of very many other things which the retailer can make which the manufacturer perhaps can make much cheaper, but we do not want to take away from him this opportunity. It is because of the difficulty of carrying out the provision of this Act, so constituted that induced us to have this Committee appointed and to draft resolutions which we thought might meet the case. Now the Committee have brought us in a resolution, and in my opinion they don't ask quite enough; they enumerate three articles for the manufacture of which they make a general request for free alcohol. In one of these, alcohol does not enter into the manufacture at all, and that is chloroform; it may enter into the manufacture of chloral—it may, but as a matter of fact, it does not, but it will do no harm to leave it there, that is all right. Now there are other drugs in which we are vitally interested, but which the retail druggists do not make. We may experiment with articles of that kind, but who can afford to pay for his alcohol for mere experimentation?—and I think we might enumerate those; it is conceded that they are made in manufacturing establishments by men who can afford to hire experts, who can afford to have large plants and expensive establishments, and such establishments as the government can afford to convert into bonded warehouses. Those are many chemicals and the alkaloids. For my part I cannot see why, when they enumerate many articles, they should not be brought under a provision of that kind and let the government try in some way to regulate their manufacture, and which will work no hardship to the retail druggist, because he does not make them anyhow, but it will redound greatly to his benefit financially, if these products could be obtained more cheaply. Now you ask me why will they, because foreign countries, particularly Germany, encourage the manufacturers of those chemicals by giving alcohol in a certain condition free for that purpose, and it is therefore practically impossible in many of the branches of chemical industries for American manufacturers to compete with the Germans. I would simply ask them if it is not possible that they put in a provision for the manufacture of chemicals and alkaloids, inasmuch as we enumerate a few chemicals.

MR. ELIEL: Mr. Chairman, I simply want to correct a statement of Mr. Hallberg. It is not a very important question; it is hardly worth while to make this trouble; but the statement was made that chloroform was very largely imported into this country, and that it was made from alcohol. Now we all know that chloroform is made by the acetone process, and alcohol does not enter into its manufacture; it is also a well known fact that not more than ½ per cent. of the chloroform sold in the United States is imported from Europe, but we do know that a great many chemicals we use here are not manufacturd in this country, because the American manufacture of chemicals is handicapped by this internal tax on alcohol, and that list includes a great many of our chemicals and alkaloids.

THE CHAIRMAN: It is a well-known fact that Merck & Co. are able to import their chemicals on that ground, and that is the only reason why they have been anxious to have free alcohol in the arts; yet at the same time I say that this question is before you for discussion.

MR. HALLBERG: Will the chairman now permit me to speak?

THE CHAIRMAN: Yes, sir, we will.

MR. HALLBERG: Mr. Good made a statement that there were only three articles named in this resolution.

MR. GOOD: Three principal articles.

MR. HALLBERG: I state that there are more; it includes all the ethers, chloral and chlorform. With free alcohol there would be no chlorform from acetone, as my friend Eliel ought to know.

Mr. ELIEL: I know that.

MR. HALLBERG: With alcohol at from 20 to 40 cents a gallon there would be no possible excuse for making it from acetone, and chlorform would again be made from alcohol. Now I would like to call upon any professor of pharmacy or any manufacturing chemist or Mr. Thompson from Washington to name a single preparation, a single compound, that is made from alcohol not embraced in these three terms, that is used in pharmacy, with the possible exception of the aldehydes.

MR. SHEPPARD: Mr. Chairman, Prof. Good said a moment ago that the question in my mind had been adopted and settled to the satisfaction of all present yesterday; I have no doubt whatever it was fully settled to the satisfaction of Prof. Good and the members of the committee, for they are all honest men; but it was not settled to my satisfaction, and I doubt if it was settled to the satisfaction of many others; because I do not take it for granted that there is knowledge enough here—we do not have an acquaintance with the facts here amongst us to decide that question. I don't believe that it is possible for me to decide it, nor am I willing to take the word of any gentleman here on that question as to whether the Secretary of the Treasury can make rules that will fit the case. I think that is not the question for us. But I do certainly hope that this Association of retailers will not send to the Secretary of the Treasury the request: "Please do not give us free alcohol." If we are going to do anything it seems to me that the best thing, and perhaps the only thing; for I have some respect for the statements that have been made on this floor, especially those made by Prof. Hallberg who has the knowledge of what he speaks of in regard to the chemical compounds, yet it seems to me that this fact alone remains for us, granting all these statements to be the only alternative left; that we send a committee of three gentlemen to Washington, whose character and known ability is such that we can feel safe to leave the whole matter in their hands without any instructions, but simply to look after our interests in so far as our interests can be looked after. If this Wilson-Gorman Bill is so thoroughly bad, if it opens up free alcohol to rumsellers and we cannot be protected, why I think we can do nothing; but do not let us as a party of retailers stultify ourselves, and throw stumbling blocks in our own path. If there is any possible way, if there is the slightest way of right to the retailer and the druggist, do pray let us give it to him. There may not be anything, but if there is our committee can find it. Don't let us send them with any instructions; let us be careful to send three men there who know enough to take up the case link by link, just as shown—in other words to do what the circumstances at the moment demand to be done. Don't hamper them with any instructions. It seems to me that that is about where we are left.

Mr. Thompson: I would like to ask the Chairman of the Committee, whether in the report of this Committee they recommend that regulations be established by the Treasury Department to confine the use of free alcohol exclusively to the manufacture of such chemical preparations in which the molecular arrangement of alcohol is broken up? I would like to know if I am correct?

The Chairman: That is the way the Chair understands it in its application to dispensing pharmacy; has any one a contrary notion?

Mr. Hechler: Have I the floor now?

The Chairman: You have the floor.

Mr. Hechler: As a plain retail druggist who has worked for years and years to have the tax on alcohol abolished, I really do not feel like adopting this report at this present time, and I feel a good deal like Mr. Sheppard feels. If the law is not exactly perfect, as it ought to be, it does not behoove us to give in all at once, because some manufacturer should happen to be hurt by it, and to say, "Oh! don't! we don't want it now!" Now as a retail druggist, I believe we can afford to keep our fingers off, and see what our wise government will do; they will provide for it properly. There is a way out of it. To rush in now, to send in a resolution to have it stopped, would be ridiculous, after the efforts of our Association for the last ten years.

Mr. Dohme: As one of the Committee who drew up this report, I merely suggest that we went over these arguments very thoroughly, especially the opposing views, and we heard all sides, and every one present was of the same opinion, that this question of free alcohol is an impossibility; the only one who could possibly be benefited by it would be the manufacturer—such for instance as the house I represent; they would get the benefit of having cheap alcohol and producing preparations at prices with which no retailer could compete. If free alcohol is allowed as in Germany and other countries for manufacturing purposes, and this is made absolutely unusable for any other purpose except manufacturing articles, and for extraction purposes, there is no free alcohol, and no land would adopt it, because to give free alcohol in any form to the general public, would only be giving it to men who use it for the liquor traffic. I mentioned yesterday, that a few days before coming to Asheville I made a call on the Commissioner of Internal Revenue on this very same subject; he was very much puzzled, and he said he did not see how there was any possibility to construe this law, there was no one in his office who could construe it, and he could give us no information whatsoever what to do. We are using alcohol on a large scale, and asked what to do about the tax, to get back the tax on the alcohol used. We might do anything we could, but he did not think we would get one cent, because the law was defective, and no doubt the Government would decide that the alcohol would have to be made unusable for internal purposes. The impression prevailed in all the Departments of the Government that as soon as Congress meets again this law will be wiped out; that seems to be the opinion of the Government officials. The law was just put in at the close of office hours, passed without examination, and on that score this report was made out.

MR. HECHLER: May I ask a question?

THE CHAIRMAN: Certainly.

MR. HECHLER: Do you suppose the law will be abolished because John Wyeth made a statement in the "Inquirer" that it would cost him forty thousand dollars if this law went into effect.

THE CHAIRMAN: I have not seen that.

MR. HECHLER: I say, do you suppose that statement will have an effect on the government?

THE CHAIRMAN: I do not think it will.

MR. WILLS: Mr. Chairman, I merely wish to express my opinion as coinciding with that of Mr. Sheppard and Mr. Hechler in the direction of free alcohol. As a retail druggist of long experience, over forty years, I have been in favor of, and have looked forward to the day when free alcohol would be accorded as a privilege to the retail druggist, or where it was used externally for medicinal purposes, in the manufacture of liniments, etc. Whether this law is so imperfect as not to accomplish that result, I don't know. With us we don't wish it at all to be used for tippling purposes. I don't think that in Virginia there is a fractional part of the druggists who handle alcohol or alcoholic preparations for the purpose of drinking. I was amused yesterday to hear the gentleman from Massachusetts, I believe it was, say that it had been proved in some cases that the druggist would have a barrel of alcohol, and would draw from it half a pint and sell a pint of old gin, or draw a pint and sell a quart of Jamaica rum. But if this law is imperfect, and we cannot get under it such rebates as would come to legitimate and properly used alcohol in making medicinal preparations, I think it should be amended or should be perfected, and that we should request the Secretary of the Treasury to do any thing to formulate or to promulgate such rules and regulations as will allow a rebate to those druggists who use it purely for medicinal purposes, and do not in any way handle or dispense alcohol or alcoholic preparations or spirituous liquors as a beverage.

MR. GREVE: While really free alcohol would be undoubtedly a great benefit to pharmacists, it seems that is an impossibility. We cannot have free alcohol: it would practically resolve itself into this, that the large manufacturer will have increased profits, because he will be able to use free alcohol, and all the little manufacturing the pharmacist does now will be thrown into the hands of the large manufacturer (applause). The large manufacturer now does a great proportion of the work by virtue of his greater facilities, but do not let us throw still greater facilities in his way. I think that is wrong. We are suffering here, and we want to make a living. If this prevails, if we ask for free alcohol, we are gone. We want no such thing. We want to see the recommendation of our Committee carried out by the government, because in that case we would have cheaper alcohol for chloroform and cheaper alcohol for ethers, and this would aid us materially in our business; but you cannot expect to have free alcohol for paregoric and similar preparations.

MR. BUTLER: Just one point that has not been touched upon, that we might consider a little with thought. It seems to me if we want to sell our stores a day or two after this law takes effect and we should adopt the resolution, the difference between the value of the stock of alcohol we possess before and after the law goes into effect should be considered; this resolution would seem to take thousands of dollars from the value of our stock.

MR. MORRISON: Several observations have been made on free alcohol. I would like to state as an authority that acetone chloroform is preferred in countries where practically free alcohol is used, and American chloroform is preferred made from acetone or by the acetone process.

MR. SLACK: Mr. Chairman, I think the point made by Mr. Dohme is a good one; I think it is highly probable the law will be repealed as soon as Congress meets, and that is very important, because, suppose we get free alcohol now, it may be repealed some time in December or possibly the first of January. Our prices must certainly decline, and it is very much easier to cut the prices down than to restore them; and if we succeed in getting free alcohol for making our spirit of camphor and ether preparations, necessarily as soon as the tax is again placed upon them you must try to restore them to the former prices, in which you will encounter great resistance.

MR. WATSON: We discussed these matters for a couple of hours yesterday afternoon, and have spent a great deal of time on it to-day, so in order to close the matter, I move the following substitute for the Committee's report; that the report of the Committee be adopted, and that a Committee of three shall be appointed by the Chair, of whom Dr. E. R. Squibb shall be one, to represent the American Pharmaceutical Association, to visit Washington when necessary, to meet Congress and guard the best interests of the pharmacists of this country. That leaves them without instructions of any kind, it leaves the Chair to appoint two, the resolution appoints one, and I think, if the Chair permits, that one of the appointees should be the Reporter on the Progress of Pharmacy, or a retail druggist from New York, or some one among the pharmacists.

(This motion was seconded.)

MR. EBERT: I hope the gentlemen will withdraw Dr. Squibb's name. He will not act for us.

MR. DOHME: If I am not mistaken, this is the same resolution which was voted down yesterday. We voted that down, and this Committee was appointed in view of this resolution, and I drew up some other resolutions.

MR. MAIN: I would remind the Chair that the resolution was laid upon the table, and it can be taken up at any time.

THE CHAIRMAN: If the Chair understands it correctly the resolutions were tabled, and as the outcome of the resolution a committee of three was appointed to bring in a report to the Association, which has been done. Now, of course, a resolution appointing such a committee would be in order.

MR. GOOD: Mr. Chairman, as apparently every one has spoken who cares to speak on this question, I would like a few last words. Now we all concede that Prof. Hallberg answered part of my remarks pretty conclusively, but the others were not answered to my satisfaction; and before I go back to that position I think I can answer one of Mr. Hechler's remarks, his allusion to John Wyeth & Bros., of Philadelphia It occurred to me that it must mean this, that the products which he has bought in the United States would be depreciated to that amount if this law prevails.

MR. HECHLER: It is the stock that he carries in his warehouses.

MR. GOOD: It is the same thing; the stock which he has manufactured would be depreciated, and no doubt it would be, but we should not consider him. Now the point—

MR. HECHLER: He don't consider us.

MR. GOOD: Now the point has not been thoroughly understood, at least by those not here yesterday, and in which my friend Sheppard differs with me—and I am surprised that he does, because he never differed with me before—it was the practical importance of sufficient police regulations to keep track of the alcohol in all the retail stores in the United States, Now the point which I made, and which I am not yet satisfied to drop, I will try to bring in by way of improvement of this resolution in these words, "in the arts and in the manufacture of alkaloids and other chemicals." Now I can concede that there is trouble here, but nothing like the trouble the government has made trying to give free alcohol to every apothecary shop in the land; they would have to exercise supervision over alcohols and chemicals, to see that they were not defranded. There is no question about that, there is something we can understand, therefore I move the addition of those words to the resolution, and in affirmation of Mr. Dohme's position, I believe as confidently as I believe anything that we can get nothing until we do something of this kind, and it will be swept away at the earliest opportunity.

MR. EBERT: I would like to second the motion of Prof. Good, and then I would like to say just one word on the subject. I fully approve of what Prof. Good has added, and I want to say this to the gentlemen, at least to the members, that in Germany the apothecary has chosen a new field for the last thirty years, besides that of being an apothecary. He has found that in times gone by he was an apothecary simple and pure, but as he had competition, and as the manufacturer of the former chemicals, larger chemicals, fell out of his hands as an apothecary, he has taken up in a small way distinct manufactures of finer alkaloids and chemicals. You would find on going especially through Germany an apothecary located in an out of the way place, who is manufacturing some alkaloid, one single item of the Pharmacopœia, which he sells to one of your great and well known mannfacturers like Powers & Weightman, like Merck & Co., who do not make a one-hundredth part of what they have on their catalogue. This is an actual fact. Now, if we would in our way, provided we had the facilities of free alcohol or a free solvent, we could possibly engage our thoughts in such a direction, and we might possibly make an extra penny, which we certainly need at this time. Now I want to ask one of these Professors whether iodoform is still made from alcohol? How is that, Professor Hallberg?

MR. HALLBERG: It is made from ethyl alcohol.

MR. EBERT: Now, we have had a long discussion on alcohol, gentlemen; there is something nearer to us that every one needs without any exception; it comes nearer to us than ether or alcohol. Every one of us is a retail liquor dealer; yes, a retail liquor dealer to-day, and you are paying the same tax, and you are on the same basis with every other rumseller. Now, if the government can be so charitable, and you are going to send a committee to Washington, it may benefit you at least to the extent of twenty-five dollars, which every one of you have got to pay, and at the same time be classed as retail liquor dealers by the United States. (Applause.) If it is practical for the goverment, if the Democratic administration and the Democratic party are so willing to relieve the people of this country of taxation, there is a tax. If, as I undertake to say, the government is willing to remove an unjust tax, let them do that, and let us take part of the burden, and if we want, we may make use of that privilege; let the government make us postal agents; remove that tax and compel us to keep postage stamps, if necessary, or compel the tax to be paid by the liquor dealer. I want to say, gentlemen, if you will travel over the world where the postal union is in existence, you do not have to do as we Americans have to do here, impose upon the druggist for a postage stamp or postal matter; all the traveller has to do in countries like France, Germany and Austria, is to go to the tobacconist, who is allowed to sell manufactured tobacco if he will keep postal matter. Now, as we are compelled by custom to sell postage stamps and receive nothing for it, our committee can put it in this way: If we are compelled to pay the tax, let that tax be removed in this way, that we are postal agents, and for that reason we will have the privilege of selling liquor. The argument I know, just as soon as I shall be seated, will come up; We don't want to make more druggists by taking away the retail liquor dealer's license. I do not know that that will make a single druggist more; at the present time we have a retail liquor dealer's tax to pay, and certainly I see it before me every day, and I see that I am paying twenty-five dollars as a liquor tax when I really don't sell in the whole year enough to pay the tax. I think that this ought not to be, we ought to be free in selling and we ought to get our money back that we lay out for that license. We ought to have a privilege not to be classed as retail liquor dealers, because my profession compels me to have a few liquors on hand; I ought to stand above the rumseller of the country.

MR. GOOD: I wonld like to ask Mr. Ebert a question, and that is, how he classes all retail druggists of the country as liquor dealers.

MR. EBERT: The government license imposes that title upon him; if you do not pay the Collector of Internal Revenue of your district, he will be around and collect it.

THE CHAIRMAN: I think we have had sufficient discussion on these questions, and I think that we all understand it perfectly, and also our relations to whiskey dealers; that part we know, and at the same time we know that every druggist ought to be doing a little more business, and we ought to give you a chance to go to your dinner at a reasonable hour.

MR. ALEXANDER: I would like to ask one question: What has become of, or what was done, with the original report that was brought in?

THE CHAIRMAN: The gentleman is about to read it.

MR. ALEXANDER: Is it before the house or is it not?

MR. MAIN: There was no motion made to adopt the report; it was simply received.

MR. GOOD: I will now make a motion that the report be adopted.

This motion was seconded by several members.

THE CHAIRMAN: Gentlemen, let us get on; let us get down to business.

PROF. GOOD: The question before us now is on the adoption of the resolution, which has been moved and seconded, and the committee has accepted the words which I have added as part of the original motion, so that you have no amendment to vote on at all, nothing but just the original resolution; in the ending sentence is included the clause, "and in the manufacture of such alkaloids and chemicals as may be specified by the Secretary of the Treasury."

MR. EBERT: I would like to speak to that motion, and I want only a moment.

THE CHAIRMAN: The gentleman has already spoken.

MR. EBERT: I spoke to the substitute, and I would like to have that Committee, it costs no more as they go to the Treasury, to ask relief for the druggists from the retail liquor dealers' tax?

MR. THOMPSON: I move to lay the amended resolution or the original resolution as it is amended on the table.

The question being on the motion to lay the original resolution upon the table, a division was called for, resulting in ten ayes and forty nays.

The question recurring on the adoption of the original resolution, it was agreed to, and it was adopted.

MR. WHITNEY: Mr. Chairman, I propose to offer the following:

WHEREAS, The American Pharmaceutical Association, after careful consideration and exhaustive discussion of the recent action of Congress upon free alcohol to be used in the arts or in any medicinal or like compound, and after reference to a Special Committee, have clearly and decidedly formulated their opinion; therefore, be it

Resolved, That Messrs. W. S. Thompson, of Washington, D. C., Charles E. Dohme, of Baltimore, Md., the Chairman of our Finance Committee, and Charles Caspari, Jr., Secretary of this Association, be requested to take a certified copy of our action recently, and a copy of our Proceedings in 1892–1893, calling the attention of the Secretary of the Treasury to the list of members, and the work in which the Association is engaged.

MR. WATSON: One moment; it does not look well to take our Minutes of 1892 and 1893, in view of our present action; it is simply stultifying ourselves; we can all see the inconsistency.

THE CHAIRMAN: There is a motion before the house.

PROF. GOOD: I would suggest that a complete printed list of the membership be taken in place of the Proceedings, to let the Secretary of the Treasury see what class of men are represented by the Association.

THE CHAIRMAN: It seems to me that the Secretary of the Treasury, and those who have the regulating of this question in their hands, certainly will not pay much attention to us; so far as our Proceedings go or are concerned, we don't amount to anything; the work will be done by a Committee. Gentlemen, is there any further motion or amendment?

MR. MAIN: I certainly hope that resolution will not prevail. As Mr. Eccles stated, after being in the drug trade and chemical trade for twenty years, and calling for free alcohol for that length of time, when we have got absolutely free alcohol, and it is only a question of formulating rules and regulations applying the law, it does not seem proper for us to turn around and say that we don't want it and don't want anybody else to have it. The manufacturers can be trusted to take care of themselves; they will look after their own interests. The idea is to get free alcohol; the manufacturers undoubtedly will get it. In my opinion the action of this Association is a mistaken one: the members have acted without a full understanding of the present position with the law as it stands; I hope they will not do this, certainly.

THE CHAIRMAN: As the chair understands, the object of the resolution is to enable dispensing chemists and druggists throughont the country to secure something for themselves as well as the manufacturers, who are about to attempt the same arduous task. I don't see any crime in the remarks or in the resolution that we have agreed to. It has been moved and seconded that a committee be appointed, such as has been mentioned, to represent the American Pharmaceutical Association on the alcohol question, and that such committee shall act when called upon. The committee, as we all know, are right near the home of nearly all of our statesmen, and can get there very easily.

The question being on the motion, it was agreed to.

THE CHAIRMAN: Is there any further business? If not, a motion to adjourn will be in order.

THE SECRETARY: We cannot adjourn until we complete the work of the Section; there is to be an election before we adjourn.

MR. PFEIFFER: There is another matter, the sale of the pharmaceutical products by manufacturers to doctors; how can that be avoided?

THE CHAIRMAN: The way to settle that question is by resolution. If you want to offer a resolution, now is the time to do it; if not, the election of officers will be in order. Gentlemen, you have got to elect a Chairman and a Secretary of this Section. Nominations are now in order.

PROF. GOOD: I nominate Mr. Seabury.

On motion, the nominations were closed and the Secretary was instructed to cast the vote of the members of the Section for Geo. J. Seabury, for Chairman of the Section on Commercial Interests.

MR. SEABURY: Gentlemen, I thank you; I shall strive to do my duty, and my efforts will be loyal. I tender many thanks for this honor. The election of your Secretary will be in order.

On motion of Mr. Sheppard, Mr. James O. Burge, of Tennessee, was nominated for the position of Secretary of this Section, and, on motion, the nominations were closed and the Chairman was instructed to cast the vote of the members of this Section for the nominee, which was done.

MR. H. M. WHELPLEY: The Constitution provides for a committee of three, in addition to the Chairman and Secretary, and the next business in order is the election of three men to serve with the Chairman and Secretary, to be associated with these two officers.

Messrs. L. F. Chalin, of La., J. M. Anderson, of Ark. and Jno. Pfeiffer, were then nominated and elected as associate members of the Committee on Commercial Interests.

MR. EBERT: Mr. Chairman, I think that the Chairman's ruling to-day requires a correction, and I want to say this, because it is right; I want to say that when Mr. Hallberg got up on this floor as the Chairman of this Committee, he got up in his proper place as chairman. Now Mr. Thompson is a parlimentarian, and when Mr. Hallberg, as Chairman of this Committee, got on up on the floor of this house to answer a question he was not out of order, and the Chairman of this Section ought to have answered him and recognized him. I want to say that that is parliamentary usage: he represented the Association and was in proper order at the time when he arose to answer the question.

THE CHAIRMAN: The Chair would say that we are not in a political meeting.

On motion, the Commercial Section was then adjourned.

MINUTES

OF THE

SECTION ON SCIENTIFIC PAPERS.

FIRST SESSION—WEDNESDAY EVENING, SEPTEMBER 5.

The Chairman, Prof. L. E. Sayre, called the meeting of the Section to order at 9 o'clock p. m., and then proceeded to read his annual address, as follows:

Gentlemen and Friends of the American Pharmaceutical Association: It is customary to allow a few minutes to the Chairman of the Section to make some remarks at this time, and I shall, with your consent, take the liberty of using the time allotted for this purpose, to present somewhat of a semi-pharmaceutical subject, believing that this will be a pleasant and perhaps profitable diversion, and undoubtedly a change from the routine of the hour.

I wish to say, however, before proceeding to the subject in hand, that I have been very much gratified with the help and the cordial endorsement of the members in the work of the Committee of this Section during the past year.

Hearty responses have been received from very many members, and those who were not in a position to contribute personally, expressed their hearty co-operation and interest in the work. I feel that the importance of the scientific side of the Association is felt on the part of every member, whether he be personally interested in the legislative, educational, or business sections of the organization, and I have felt greatly honored in acting as the representative of this one special department.

I have with me 41 papers to be read at this session—many of these are of necessity lengthy, and according to the rules and the policy of the Association it is necessary, of course, that these papers be presented in abstract. The writers of many of them have already expressed a desire that they be relieved of the trouble of reading them, and that the reasons for the paper and the information connected with it should be given, which the paper does not contain, believing that the paper itself will be best represented in the pages of the report, without being read at this meeting.

It is my desire that at an early time in the meeting a special committee be appointed to consider a contribution which I have here from Mr. J. B. Nagelvoort, entitled "Advance Sheets of the Analytical Companion to the United States Pharmacopœia, 7th Edition."

This work is offered to the American Pharmaceutical Association at this meeting by the author, who suggests that when the work is complete it be published in a form somewhat similar to the National Formulary, and be distributed to the members of the

Association at actual cost. I have looked over the material and have consulted with the President of the Association, who, with me, has agreed that it would be best to have a few duplicate copies type-written, and that these copies be distributed to the members of the committee who shall be appointed at this meeting to determine upon the proper disposition of the paper, or rather the work itself when completed, as to whether the Association shall accept it upon the terms of the author or not.

Certainly the thanks of the Association are due to the author for his good words which have accompanied this offer, and for the effort that he seems to have put forth in an unselfish way; and I would therefore suggest that, as I have stated, at an early time the Association appoint a committee of five or any other number which shall go over the type-written manuscript and make a report with recommendations upon it.

Now, as I have stated, I shall endeavor to entertain the friends at this meeting in lieu of an address, with the brief treatment of a semi-pharmaceutical subject.

It may be known to some of the members of the Association that I have had the pleasure of examining during the past year, the product produced in New Mexico from the seed of the Trieste Colocynth. A paper upon this subject was published under the head of "American Colocynth." The paper suggested to some friends that perhaps I was not aware of the fact that the "Colocynth apple grows wild in the state of Kansas."

At the last meeting of the Kansas Pharmaceutical Association I was told by one of the visiting members that he had met in his travels a druggist who had said, in effect, that the Colocynth apple was a native of the western part of the State. This interested the gentleman so much that he procured a sample, and kindly brought it to me for its identification. I present to you here the root of this plant for the purpose of showing its marvelous growth.

We have in the open plains, at an altitude of 2000 feet above the sea up to the base of the Rocky Mountains, these enormous roots, some presenting odd characteristics not observed in some found in the eastern regions. One of those is the *Cucurbita perennis, Gray*, now known as the Cucurbita foetidissima—the common name of which is Wild Pumpkin, or man-in-the-ground. It produces a trailing stem; varying triangular, wooly, pubescent leaves, whose blades are 6 or 8 inches in length, the fruit being about the size of an orange, perfectly spherical in shape, yellow when ripe, with greenish longitudinal markings, fibrous internally, as can be seen by inspection. The seeds are generally about 200 to the apple, about one-third of an inch in length. The root, however, is the remarkable part of the plant. It is hollow, the inside of the cavity being covered with a healthy cortex; around the margin of the cavity are the remains of several stems showing that in this portion the buds of the annual stem appear. At about two feet from the ground the root bends abruptly and sends out a couple of branches. The root is fibrous internally, almost woody, containing an enormous amount of stored-up nourishment for the rapid development of annual stems; but this store of nourishment is amply protected against the hungry gophers, moles and mice and other animals, by its intense bitterness.

Prof. Bessey, writing upon this subject, says that in the struggle for existence only those roots have remained whose bitterness was sufficient to overcome the hunger and thirst of the animals of the plains.

Prof. Bessey in an article on this subject speaks of another root which resembles this very much, known as the wild morning glory—the *Ipomœa leptophylla*, Torr.—a beautiful plant with a bushy head bearing numerous large purple flowers, closely resembling those of the common cultivated morning glory of the gardens; the stems being numerous, branching, rarely attaining the height of a couple of feet, but the root is also enormous, often approaching the size of the wild pumpkin.

I may state in closing that the roots of the wild pumpkin have been found of about seven feet in length and of proportionate diameter.

It may be interesting for the members of the Association to know that the State of Kansas, although a portion of it is an arid region, can show enormous growths, and these growths may be of some possible value medicinally. This subject has not been investigated, but I propose during the next year to ascertain the constituents of this bitter root, and shall be very glad to contribute my work to this Association.

On motion of Prof. Good, seconded by Mr. Conner, the address was received and referred to a Committee of three, to be appointed by the Secretary.

No committee work having been reported, the Chair requested nominations for officers for the coming year, as being the next business in order. The following gentlemen were nominated and the Secretary directed to post the names in the hall: For Chairman, Prof. J. O. Schlotterbeck, of Michigan, Chas. Holzhauer, of New Jersey, and Dr. Edward Kremers, of Wisconsin. For Secretary—Prof. Geo. B. Kauffman, of Ohio, Prof. J. H. Beal, of Ohio, and Dr. A. R. L. Dohme, of Baltimore.

A motion to proceed with the reading of the papers having been agreed to, the Chairman stated that the first in order was the paper offered by Mr. Nagelvoort, and he asked for a motion to appoint a Committee of three or five to examine the paper and report at a future meeting as to the disposition thereof.

A motion by Dr. Stewart to appoint such a Committee was seconded and agreed to, whereupon the Chair named Profs. Patch, Oldberg and Hurty as the members of the Committee.

The following paper on Rhus toxicodendron was then read by H. M. Whelpley:

RHUS TOXICODENDRON.

BY DR. H. M. WHELPLEY, PH. G.

Toxicodendric acid, isolated by Maisch, is now generally recognized as the medicinal and poisonous principle of the plant. The prevailing opinion that this acid exists to a greater extent in the fresh than the dried drug is evidenced by the Pharmacopœia directing the use of the fresh plant. Goss says that the fresh plant is the best, Potter believes that the dried leaves usually prove inert, while Woodbury asserts that the dried leaves are worthless.

The writer being easily affected by the toxic properties of the fresh plant, determined to give the dried drug a practical test. The handling of the dried and compressed leaves produced the well-known eruption, so not a shadow of doubt on the subject exists in his own mind. Since making the above test, I have learned that the workmen who handle the dried drug in making the fluid extract are sometimes poisoned. While the active properties of Rhus toxicodendron may be impaired by drying, they are not entirely destroyed.

From the wholesale trade I learn that the drug does not play an important part. Practically, no demand exists for the dried drug, while the fluid preparations are seldom ordered. Out of 36,515 prescriptions filled in different parts of the State and reported to the Illinois State Pharmaceutical Association by Mr. A. E. Ebert, but five called for this remedy, four specifying the fluid extract and one the tincture. Neither Bartholow nor Hare mention the drug in their works on Therapeutics. Shoemaker says it is rarely employed by the regular practitioner. Hausemann refers to it as an obsolete drug, while Wilcox claims that it is dangerous and probably useless.

The medicinal virtues of the plant were announced by the aborigines of this country and vaunted by many of their successors. It was first used in England about 1798.

The remedy has been recommended for many diseases. Among them are the following:

Nocturnal incontinence; palsy; delirium; herpes zoster; old ulcers; acute, sub-acute, and chronic rheumatism; ozœna; sciatica; tympanitis; paraplegia; chorea; chilblains; paralysis; erysipelas; stings of insects; typhus; typhoid fever; sprains; eczema; pemphigus, and many other skin diseases.

The poisonous action of the plant is well known and the remedies numerous. The more popular are as follows:

Solution of chlorinated lime, human urine, lead water, sodium hyposulphite, tincture of lobelia, saline purgatives, Monsell's solution, warm water and soap, petrolatum, zinc sulphate, grindelia squarrosa and robusta, mercuric chloride, strong coffee, verbena, bryonia, potassium permanganate, opium, lime water and linseed oil, bromine, black wash, copper sulphate, oxalic acid, phenol, potassium chlorate, alum, bismuth subnitrate, hamamelis, stramonium, sassafras, elder, boneset, gelsemium, dulcamara, sodium bicarbonate, sodium sulphite.

THE CHAIRMAN: The paper is open for discussion, and I would call your attention to the limited time; we have two sessions besides this evening. I do not want to cut off what little discussion there is. Those who care to talk upon papers will limit themselves to five minutes, and I will remind them when the five minutes are up.

DR. BARTLEY: It may be a matter of some interest to state that I myself was poisoned; the first time I was affected by the dry leaf—in winter time, the dry limb rather, with no leaves at all. Prior to that time I had handled it with impunity, but in working in the brush in the winter time, where it was thoroughly frozen, I became thoroughly poisoned, and afterwards was poisoned by the leaves.

MR. HALLBERG: I have ground a great many pounds of dry rhus toxicodendron, and never observed any effects. I believe that the preparations from the dry drug are comparatively worthless. I do not mean to say that they have no medicinal virtue. Now, rhus is used very largely by homœopathic and by ecclectic physicians, and I believe the proper mode of drying and curing the herbs of the Pharmacopœia is a very important subject, and a subject touched upon at nearly every meeting. I would like to hear about the effect of drying and curing drugs from a gentleman who knows more about it than any of us or all of us combined, Prof. Lloyd.

THE CHAIRMAN: I would like to ask before Prof. Lloyd rises to speak, whether Mr. Hallberg is susceptible to poisoning with Rhus?

MR. HALLBERG: I have never been poisoned by it.

MR. LLOYD: I thank Prof. Hallberg for his compliment, and would say for many years I have worked in and raised the drug in considerable quantities. Dried Rhus I never found any one susceptible to, although working it in some quantities, and in making the fluid extract; but an eclectic told me to use the fresh Rhus, and some persons say they actually can handle this in any quantity without being affected by it, and others cannot stay in the room when it is being put in the bottles without being affected. Some people are so sensitive to the fresh Rhus that I have known one young lady from being simply in the room in which tincture of fresh Rhus was being filled, so affected by it that she would be laid up for two weeks; I could hardly believe it was possible, that without handling it, and without being near it, this could be true; but it was demonstrated to me more than once, until finally whenever Rhus was to be opened she was directed to stay at home that day and not allowed to come into the establishment. Others, one of the men in the establishment, would go into the country, take the leaves when fresh, tear them from the vines, put them into sacks, take them back again, put them into the percolator. and pour alcohol over them, and not be affected in the least. I will add that the young lady was sensitive to the fresh, and has never been poisoned with the dry preparation, although she has handled it. Idiosyncracies of those who handle this substance seem to be very various. I have known some eclectic physicians who will not use any preparations made from the dry Rhus. They insist on using the green drug, and especially the leaves gathered in the fall just before they begin to change their color.

MR. PAYNE: I would like to say that as to Rhus I have been poisoned four times. In my native state there are enormous quantities of the Rhus toxicodendron, and it is not so poisonous as some of the other varieties. I was poisoned once by Rhus venenata after it had been dug up for some time and dried, and I would advise pharmacists not to dry Rhus if at all susceptible. I knew one case where a gentleman slept in the woods where a quantity of Rhus was growing, and he died from the effects of it.

MR. LLOYD: I would like to make a correction. Mr. Main informs me that I said inadvertently it was the root of the Rhus; it was the green leaves, matured leaves.

THE CHAIRMAN: That makes the contribution of the evening a very valuable one, because here we have a case where the dried leaf has actually produced the specific effect. Now how can we possibly reconcile the two conditions? I think that it might be suggested that in the dried condition it is more dormant perhaps; you may theorize in that way. Certainly, we have here a subject worthy of investigation, and I hope some one will take it up and present a paper upon the same subject another year, a paper upon the effect of drying drugs.

MR. ELIEL: This is an interesting paper on Rhus, and we all know what effect it has. It might be interesting to know a very simple remedy for Rhus poisoning.

MR. WHELPLEY: I named 34.

MR. ELIEL: Did you name sulphite of potash? If you did not, that in my experience is the quickest and most effective remedy for Rhus poisoning used externally—a strong solution of sulphite of potash applied just as hot as you can stand it will remove the effects of Rhus poisoning in from twenty-four to twenty-eight hours.

MR. PAYNE: It certainly is a very good remedy.

MR. KEBLER: At one time a doctor had occasion to make a lot of tablets: he not being susceptible to the fresh herb, would put his hands right into it and mix it with his hands, and the result was he was terribly affected by the dry powder.

MR. PATCH: We had recently a man poisoned from the Rhus tox. by the dry leaves. Another case in which after trying various remedies the case became aggravated, so the young man used a remedy recommended last year, resorcin, glycerin and gelatin, making a solution of such density that it could be placed on while warm. We called to see him at his room and found him badly swollen; he could not see out of his eyes, and was suffering a great deal of torment. After applying the remedy for six hours, allowing it to remain six hours, soaking it off with warm water, and applying the solution again, he was able to be about in thirty-six hours, and in fifty hours he returned to work.

MR. CONNER: It seems to me the nature of the poison would tend to suggest the remedy, whether it should be alkaline or acid. No one seems to have appreciated that part at all.

MR. LLOYD: You had better see Prof. Payne's work on that.

MR. ALPERS: Prof. Maisch established that it was an acid.

MR. SIMPSON: I have had persons poisoned in the country caused by clearing up the ground; the green leaves are freqnently burned with the wood, and some are so susceptible to the poison, that the smoke of it will affect them; I have had several cases of that kind. I have found an ointment of salycilic acid a specific remedy; have never known a case in which it failed to cure in the course of twelve hours, all the swelling disappearing. I stopped one year on the banks of the Susquehanna in York county; the people there were collecting the laurel and using it. Dr. Johnson asked me on morning to go around and see his patients; he had fifty cases of Rhus poisoning—he said there was but one thing that he depended upon. I went in and saw the remarkable effect of the fluid extract of serpentaria applied locally to the skin, but this does not always produce a cure. You will find although we have a great many remedies we have a great many failures; some one remedy seems to suit one particular class of individuals. As to this poisoning by Rhus tox., there are other plants which will produce the same effects. I have found that some are very susceptible to buckwheat, and it will produce the same condition of the eyes. There are some people so susceptible to the buckwheat that they become poisoned with it. There are some people who cannot ride by a buckwheat field without becoming poisoned.

MR. WHELPLEY: I am glad to hear of these new remedies. The best remedy I have found is ammonia water. At an advanced stage it is of no value. The only thing found of value then is a preparation like Goulard's Extract.

MR. MOHR: In regard to the condition of the dried drug, it seems to me that some important information might be gained by noting the time of collection and drying. We have two statements presented, one in which a gentleman claimed that without any question the dried drug has a poisonous effect, and in another case we find a person very susceptible to the poisonous effects of the fresh drug. It seems to me that these points —the time of collection and the method of drying—might be of some use.

MR. BAKER: I have used the tincture of lobelia.

MR. CRISSWELL: I am very easily poisoned, and get relief from iodine and sulphite of calcium. I have relieved a hundred cases or more with this remedy.

MR. ECCLES: This over supply of remedies would tend to a course of treatment without remedies—using water. We generally find that in poisoning a great many cases will be cured without any remedy.

On motion of Mr. Conner, the paper was received and referred to the Committee on Publication.

The following paper was presented by its author, who gave an excellent abstract of its contents :

THE GRAIN WEIGHT. A STUDY OF WHEAT.*

J. U. LLOYD.†

PART FIRST.—HISTORICAL.

The cereal *Triticum sativum* is the most valuable of food producing plants, its seed, under the name of "wheat," being the principal breadstuff of civilized nations. The plant is accepted by some to have been a grass that originated in the Mediterranean country, but this impression seems largely to be based on conjecture, and its origin as a food plant is probably lost in the darkness of antiquity.

Scripture mentions the plant, and by some persons its origin has been ascribed to ancient Egypt. China is said to have introduced wheat 2700 years before Christ. These points are records of general history and pass comparatively unaltered through ordinary literature.

Standard modern dictionaries inform us that the weight of the fruit of this plant is the basis that six hundred years ago in England was used to establish the grain weight. Most authorities make the same general statement, to the effect that a plump grain of wheat was used as the standard employed to establish the grain ; but Prof. Remington (Remington's Pharmacy) gives the matter a historical record better than any other pharmacy work consulted, and with which in a general way my own researches agree.

As the statements of authorities as a rule coincide with that of Webster, it may be taken as typical, to wit : "*Grain.*—The unit of the English system of weights, so-called because considered equal to the average of grains taken from the middle of the ears of wheat." This would lead us to believe that a grain in weight should be the counterpart of an average grain of wheat.

Concerning the origin of the grain weight, C. W. Pasley, "Measures, Weights and Money," London, 1834, p. 8, says : "—those days of feudal ignorance, in which the standard of English linear measure was referred to the average length of a barley corn, and the standard of weight to the average weight of a dry grain of wheat from the middle of the ear," which might also lead to the inference that our present grain weight represented the weight of an average grain of wheat at the time of standardization.

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* As a study of the grain weight in its connection with the grain of wheat, perhaps this paper is sufficient. As a study of wheat in an economic sense, many gaps should be filled. For example, England, New Zealand, and Australia should each be averaged in an equal number of specimens to those of other countries. And now I desire to express my thanks to my friend, Dr. Sigmund Waldbott, who, with painstaking care assisted in the detail work of the investigation, and to whose patience I am largely indebted for the completeness of this paper.—L.

† Contributed to the American Pharmaceutical Association 1894.

But careful preliminary weighings which I had made of good samples of wheat, convinced me that an inference drawn to that effect would be erroneous, and that modern grains of wheat do not average a grain in weight. It is exceptional for a single, abnormally large wheat grain to weigh a grain.

Giving the literature on the subject some further study, in order to find an explanation of the inconsistency mentioned, I arrived at the fact that while the grain weight actually represented the weight of average grains of wheat about 600 years ago, this standard was changed 200 years afterwards.

Johnson's Universal Cyclopedia, 1893, gives the following summary of that fact in the definition of the word "Grain:" "*Grain.*—A statute of Henry III. (in the year 1266) enacted that *32 grains* of wheat from the middle of the ear, well dried, should weigh a pennyweight, of which 20 should go to the ounce; but finally in the 12th year of Henry VII, the pennyweight came to be divided into *24 grains*."

Thus it is seen that 32 standard grains of wheat were used six hundred years ago to establish the *pennyweight*, which then became the *unit* of weight. This pennyweight, about two hundred years afterwards, was divided into 24 parts, and thus produced the number of grain weights (24) that now (providing no other changes were made in the standard) make a pennyweight. Hence, in order to conform to the standard inaugurated by statute of Henry VII, one pennyweight (or 24 grains in weight) should now balance 32 grains of wheat, if wheat still conforms in size and weight to the standard taken as an average of wheat in the year 1266, or 100 grains of wheat should only weigh 75 grains.

COMPARISON OF DIFFRENT WHEATS.

We have thus (if no subsequent change was made) a well-established standard concerning the weight of wheat six hundred years ago, and an average of the wheat of the world now should show us the effect that time and cultivation have had on the size of the fruit. It is not enough for this purpose to take the product of a single State or of one country; a broad average should be made of the wheats of the world. This seed, like other plants, is affected by drouth and climatic influences, and yet, an average of the wheat products of the principal wheat-yielding lands of civilization might give us a record that may be accepted as indicating either that the grain, so far as size is concerned, is being improved or is retrograding. The English grain weight has probably remained intact since its second standardization,* and if any change has occurred, it is to be looked for in the weight of the seed of the wheat. According to the statute of King Henry III (already cited), the standard grains are "well dried," and in the determinations made herein, well-dried is taken to have meant air-dried. We are told by the Century Dictionary that such countries as yield a surplus of wheat are the United States, Canada, Russia, Hungary, India, Australia, Egypt, Roumania and Turkey. In addition to specimens from most of these countries, I procured also specimens from New Zealand, England and several South American States. These specimens are taken from commercial lots, and are averages of such as are sold in large amounts in the grain market, all of crop 1893,† except Rosario, 1892.

Here I may add, that most of the American, as well as the foreign specimens, were procured by Messrs. Smith, Hammond & Co., of Baltimore, to whom I was introduced through the courtesy of Messrs. Gale Bros, Cincinnati, O., and that Mr. Albert McCullough, of the firm of J. M. McCullough's Sons, of Cincinnati, cabled to London for Egyptian wheat,‡ and collected the Ohio and Wisconsin samples. To these gentlemen my thanks are herein extended ; but for their enterprise the research would have been impracticable.

On comparing the samples it is seen that they can be divided into classes ; one "red wheat," hard, compact, horny, elongated, usually slender, and of a red brown, often dark, nearly amber color ; the other, "white wheat," of larger grain, more plump, of usually chalky (starchy) fracture, and of a yellowish white color.

Since I found no record concerning the variety of English wheat that furnished the standard of the grain weight, it is unnecessary for us to separate the two classes, and hence, in this part of the paper, I shall average them all.

One hundred grains were selected from each specimen, care being taken to select full, plump, smooth, perfect seeds, of a uniform, large size. By comparing the wheat in the heads of wheat from our Ohio wheat fields, it was shown that by this method a close average could be made of the size of the middle grains of wheat of the head.

The result was as follows :

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* "Fortunately, one unit common to troy, apothecaries' and avoirdupois weight has been saved,—namely, the *grain*."—*Remington's Pharmacy, p.* 35.

† Weighings were made the second week in August, 1894. A loss of 6.77 per cent. resulted in new wheat out of the harvest field after five days' exposure to a temperature of 138° F. in a drying room.

‡ The Egyptian wheat did not come to hand in time to be included in this paper.

Table I.

One hundred wheat grains of uniform size weighed as follows:

*84.190,	Grains,	No. 1, Club, Bombay, India.
*79.118,	“	No. 1, Bombay, India.
*78.128,	“	Choice, Bombay, India.
*77.890,	“	Chili.
*87.878.	“	New Zealand, White.
77.378,	“	England, Red.
*74.430,	“	California, Choice,
*72.083,	“	New Choice, Bombay, India.
69.973,	“	New Zealand, Red.
*67.836,	“	Australia.
*66.593,	“	Chili.
*64.838,	“	England, White.
*60.343,	“	California, No. 1.
*56.857,	“	Kurrachee, Soft, White, India.
*56.638,	“	Baltic, Russia.
55.318,	“	Barletta, South America.
*54.918,	“	Calcutta, India.
*54.890,	“	California, Blue Stem.
*54.668,	“	Kurrachee, White, India.
54.190,	“	Rosario, Argentine, 1893, South America.
54.164,	“	Kurrachee, Red, India.
53.698,	“	Patagonia, South America.
53.613,	“	Ohio, Poole, Winter.
53.423,	“	Azima, Russia.
51.983,	“	Azima, Odessa, Fine.
51.853,	“	Baltimore, Red, Winter.
51.431,	“	Entre Rios, South America.
*51.403,	“	Ohio, White, Winter.
49.543,	“	Black Sea, Ghirka, Russia.
49.268,	“	Ghirka, Fine, Russia.
47.828,	“	† Chicago, Spring.
47.404,	“	Wisconsin, Spring.
46.693,	“	Duluth, Hard.
46.133,	“	Black Sea, Azima, Russia.
46.078,	“	River Plata, South America.
*45.658,	“	Washington State.
43.908,	“	Manitoba, Spring, Hard.
43.753,	“	Rosario, (Argentine,) 1892, South America.
42.923,	“	Odessa, Azima, Russia.
42.783,	“	Ghirka, Fine, Russia.
40.478,	“	Duluth, Spring.
37.448,	“	Ghirka, Russia.

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* Denotes white wheat, and it is obvious from this table that white wheat heads the list, as far as size of the grain is concerned.

† North-West probably.

It would be erroneous, however, to base a commercial valuation of wheat solely upon the weight of the grain, and the second part of the paper will demonstrate some additional considerations that lead us to modify the results of such a valuation.

From the foregoing list the two following tables are abstracted:

I.—AVERAGE WEIGHT OF WHEAT FROM EACH COUNTRY.

	Grains.
Australia and New Zealand	71.895
England	71.108
India	66.765
South America	56.119
United States and Canada	51.541
Russia	47.795
Total average	60.870

II.—AVERAGE WEIGHT OF THE HEAVIEST SAMPLE FROM EACH COUNTRY.

	Grains.
India	84.190
South America	77.890
Australia and New Zealand	77.878
England	77.378
United States and Canada	74.430
Russia	56.638
Total average	74.734

SUMMARY:

1. Accepting that the standard grain weight was created from grains taken from the middle of a selected head of wheat, it is shown that from bulk lots of wheat that appear in most of the markets of the world, an average of the heaviest samples will yield a grain as heavy as was the grain of the original standard.

2. The general average of all the samples is below the standard grain weight, being 60.870, when it should be 75.000.

3. With few exceptions, white wheat headed the list as far as weight and size of grain is concerned.

4. Warm countries seem to yield the largest grain, and also contributed the greatest proportion of white wheat according to these samples. Thus India furnished but one specimen of red wheat out of eight considered, and supplied three specimens to head the list in comparative weight, while Russia furnished but one specimen of white wheat (which, however, came from the Baltic Provinces,) out of nine samples, and averaged last in the list (see Table I.).

PART SECOND.

ECONOMIC.

As citizens of a country we love, we as Pharmacists are as greatly interested in the welfare of our land as can be any class of our people. We cannot evade the fact that any problem that affects our bread-raisers, is of vital concern to ourselves. Hence it would be inconsiderate, with the specimens of wheat in hand, not to carry this study beyond the point that directly concerns our special field. For that reason I intend to make, in the following lines, a comparison of the different samples at my command, in order to arrive, if possible, at some conclusion as to the rank which our home products occupy compared with those of other lands.

Quite a number of considerations should enter collectively into the commercial valuation of a specimen of wheat, and chemical analysis should hold one of the first places, because it is the only agent by means of which we can determine the nutritive value of any specimen of wheat; yet in commerce, no chemical standard is accepted by which to place a valuation on wheat in the markets of the world. Other points, simply calling for the judgment by our senses, for example, color, flavor, degree of mustiness, qualities that cannot be brought within the domain of physical or chemical experimentation, are given great consideration by dealers in grain. Although I do not undervalue the importance of expertness gained in such a direction, I doubt very much whether the results, without being sustained or modified by additional methods of examination, are as exact as should be the case where it is necessary to properly differentiate in the money values of so important a production.

In this study, however, I must refrain from recording any chemical comparisons, and will instead give the results of some experiments carried out in the following directions: (1) Comparing the percentage of impurities to be found in the samples. (2) Comparing the densities of the wheat specimens.

COMPARING PERCENTAGE OF IMPURITIES.

Some of the samples of wheat, especially those of Indian origin, presented to even a superficial observation such a striking amount of impurities, that I thought it advisable to first establish in a general way the degree of impurity in each sample on hand, before taking any further step towards differentiating in their qualities. It cannot fairly be asserted, however, that the results thus obtained on an exceedingly small scale, should represent the absolute percentage of foreign matter contained in very large bulks of wheat, from which the sample was taken; although it is well known that in trade there is great skill displayed in abstracting from car loads of wheat small samples which fairly represent the composition of the large bulk.

In order to obtain a standard amount of wheat from which to calculate the percentage of impurities, 20 C.c. of each specimen of wheat were measured exactly, (without packing the wheat) and this volume was then weighed to the nearest quarter grain. The results of these weighings are contained in Column 2 of Table II.

The same wheat was then cleaned by picking out the impurities, such as straw, chaff and foreign bodies, and the weight of this amount was then referred to 100 parts of the weight of wheat which the 20 C.c. contained.

These values are recorded in Column 3, Table II.

For example, Rosario wheat, 1892, contained 17.49 grains of impurities in 219.5 grains, the percentage of impurities being therefore 7.97.

COMPARING DENSITIES.

The weight of 100 grains, as shown in the first part of the paper (see Table I.), having given widely different values, it might justly be supposed that specimens, of which 100 grains show the highest weight, will also be considered the most valuable in commerce, unless glaring defects, *e. g.*, high percentage of impurities or worm-eaten grains, etc., should exercise a depreciating influence.

But a valuation based solely upon the weight of the grain, would unconditionally extol all the specimens of heavy grains, although this superior quality may sometimes be counteracted by too loose a structure, that is, too low a density of the grain, which may be considered undesirable in some cases.

Again, a wheat specimen with small weight and size of its grain, which would rank low according to the estimation by weight of the grain only, may be redeemed for what it is lacking in size and weight, by a greater compactness, that is, density of the grain.

Hence, in order to obtain a rational basis for comparison, I sought to arrive at the weight of the wheat samples as referred to a common unit of space by determining not only the weight of 100 grains of wheat, as Table I. demonstrates, but also the bulk of the same 100 grains.

A relation between weight and volume of the wheat might also be established in a way similar to that in which wheat is measured on a large scale in a bushel, *i. e.*, by filling a large graduated glass to its top mark with the different kinds of wheat successively and weighing the grains : but as I herein endeavored to determine the density of the wheat samples free from impurities, it was impossible to obtain in all cases, especially so with the foreign wheats, enough material to determine the value in question by this procedure. I therefore resorted to the following method, which is also more scientific, because it emancipates us from the influence of the interstices between the grains, and therefore records a quality that is inherent in the grain of wheat.

Briefly told, the space which the 100 grains of each wheat specimen occupy, was measured by the amount of water they displace, and the details of manipulation are as follows: A 25 C.c. burette, graduated into tenths of a C.c., was partly filled with distilled water of about 73° F., and the reading was made; then the 100 wheat grains were thrown in carefully, and after agitating and rotating the burette for *15 minutes* in each case for the purpose of practically expelling the air adhering to the grains, the second reading was made; the difference between the two readings gave the volume of 100 grains expressed in C.c.

The density was then easily found by dividing the weight of 100 grains (expressed in grams), by the space of 100 grains (expressed in C.c.); the result, density or specific gravity, tells us the weight in grams of wheat contained in 1 C.c. of wheat substance.

Example: 100 grains of choice Bombay weighed 78.128 grains=78.128×0.0648=5.063 grams. 100 grains of Choice Bombay occupied a space of 3.75 C.c., weighing 5.063 grams, or 1 C.c. wheat substance weighs 1.350 grams, which is the density.

While the method described is not offered as being absolutely orthodox in its details, the results can be safely utilized as a basis for comparison, as determinations were all made under exactly the same conditions.

Of the following two tables, Table II., Column 1, records the densities, which it is seen range from 1.320 to 1.394.

Table III. summarizes all the values obtained herein, and classes the wheats according to their origin; moreover, within each division the wheats are arranged according to the size of the grain, which figures are found in the second column.

TABLE II.

	1 Densities. 1 C.c. weighs	2 Weight of 20 C.c. wheat.	3 Impurities contained in 20 C.c. wheat.
Duluth, Hard, Spring	1.394 grams.	233. grains.	1.37 per ct.
Manitoba, Spring, Hard	1.388 “	232.3 “	0.72 “
*Ohio, White, Winter	1.387 “	235.5 “	0.87 “
*India, No. 1 Club, Bombay	1.385 “	232.5 “	4.76 “
Baltimore, Red, Winter	1.383 “	230.5 “	0.46 “
Black Sea, Azima, Russia	1.383 “	226.5 “	8.44 “
Duluth, Spring	1.380 “	227.5 “	3.65 “
Patagonia, South America	1.380 “	232. “	2.39 “
Wisconsin, Spring	1.377 “	227. “	0.14 “
Chicago, Spring	1.377 “	236. “	0.30 “
*Australia	1.377 “	242. “	0.47 “
*India, New, Choice, Bombay	1.377 “	241.5 “	0.67 “
Ghirka, Russia	1.371 “	227.5 “	2.13 “
Kurrachee, Red, India	1.371 “	212.5 “	19.42 “
Entre Rios, South America	1.370 “	225. “	4.01 “
*Calcutta, India	1.368 “	232.5 “	8.48 “
Ghirka, Fine, Russia	1.364 “	227. “	0.97 “
Black Sea, Ghirka, Russia	1.360 “	221.5 “	2.64 “
*California, No. 1	1.358 “	235.5 “	1.13 “
Azima, Fine, Russia	1.358 “	231. “	9.16 “
New Zealand, Red	1.358 “	233. “	0.95 “
Azima, Odessa, Russia	1.358 “	223.5 “	11.68 “
Ohio, Poole, Winter	1.357 “	233.5 “	0.03 “
*Kurrachee, White, India	1.357 “	220.5 “	15.67 “
River Plata, South America	1.357 “	239.5 “	9.21 “
*India, No. 1, Bombay	1.356 “	232.5 “	5.73 “
*India, Choice, Bombay	1.350 “	232. “	6.29 “
*Kurrachee, Soft, White, India	1.350 “	232. “	12.41 “
*England, White	1.346 “	237.5 “	0.15 “
*New Zealand, White	1.346 “	263. “	0.00 “
Rosario, Argentine, 1893, South America	1.346 “	231.5 “	1.73 “
Ghirka, Fine, Russia	1.345 “	223.5 “	3.56 “
*California, Choice	1.343 “	229.5 “	2.61 “
Odessa, Azima, Russia	1.343 “	219. “	6.76 “
Barletta, South America	1.342 “	227.5 “	2.53 “
*California, Blue Stem	1.338 “	221.5 “	0.93 “
England, Red	1.337 “	238. “	0.00 “
*Chili	1.332 “	237.5 “	0.23 “
Rosario, Argentine, 1892, South America	1.313 “	219.5 “	7.97 “
*Washington State	1.327 “	224.5 “	0.49 “
*Chili	1.323 “	228.5 “	1.41 “
*Baltic, Russia	1.320 “	220.5 “	0.55 “
Average	1.356 “	227.1 “	

TABLE III.

COMPLETE SUMMARY.	100 Grains of wheat		Densities.	20 C.c. commercial wheat.	
	weigh 1	occupy space. 2	Weight of 1 Cc. wheat subst. 3	weigh 4	contain impurities by weight. 5
AUSTRALIA AND NEW ENGLAND.	Grains.	C.c.	Grams.	Grains.	Per cent.
*1. New Zealand, White....	77.9	3.75	1.346	233.	0.00
2. " " Red	69.97	3.34	1.358	233.	0.65
*3. Australia	67.8	3.19	1.377	242.	0.47
Average	71.9	3.42	1.360	236.	0.37
ENGLAND.					
4. England, Red.........	77.4	3.75	1.337	238.	0.00
*5. England, White........	64.8	3.12	1.346	237.5	0.15
Average	71.1	3.43	1.341	237.7	0.07
INDIA.					
*6. No. 1, Club. Bombay....	84.2	3.94	1.385	232.5	4.76
*7. No. 1, Bombay.........	79.1	3.78	1.356	225.	5.73
*8. Choice, Bombay........	78.1	3.75	1.350	232.	6.29
*9. New Choice, Bombay	72.1	3.39	1.377	241.5	0.67
*10. Kurrachee, Soft, White..	56.9	2.73	1.350	222.	12.41
*11. Kurrachee, White	54.7	2.61	1.357	220.5	15.67
*12. No. 2, Calcutta.........	54.9	2.60	1.368	232.5	8.48
13. Kurrachee, Red........	54.2	2.56	1.371	212.5	19.42
Average	66.8	3.17	1.364	227.3	9.18
RUSSIA.					
*14. Baltic	56.6	2.78	1.320	220.5	0.55
15. Azima, Fine	53.4	2.55	1.358	231.	9.16
16. Odessa, Azima.........	51.98	2.48	1.358	223.5	11.68
17. Black Sea, Ghirka......	49.5	2.36	1.360	221.5	2.64
18. Ghirka, Fine	49.3	2.34	1.364	227.	0.97
19. Black Sea, Azima	46.1	2.16	1.383	226.5	8.94
20. Odessa, Azima	42.9	2.07	1.343	219.	6.76
21. Ghirka, Fine	42.8	2.06	1.345	223.5	3.56
22. Ghirka	37.5	1.78	1.371	227.5	2.13
Average	47.8	2.28	1.355	224.4	5.15
SOUTH AMERICA.					
*23. Chili	77.9	3.79	1.332	237.5	0.23
*24. Chili	66.6	3.26	1.323	228.5	1.41
25. Barletta	55.3	2.67	1.342	227.5	2.53
26. Rosario, Argentine, 1893.	54.2	2.61	1.346	231.5	1.73
27. Patagonia.............	53.7	2.52	1.380	232.	2.39
28. Entre Rios............	51.4	2.43	1.370	225.	4.01
29. River Plata............	46.1	2.20	1.357	239.5	3.21
20. Rosario, Argentine, 1892.	43.8	2.13	1.331	219.5	7.97
Average	56.1	2.51	1.347	230.1	2.92
UNITED STATES AND CANADA.					
*31. California, Choice	74.4	3.59	1.343	229.5	2.61
*32. California, No. 1.......	60.3	2.88	1.353	235.5	1.25
*33. California, Blue Stem ...	54.9	2.66	1.338	221.5	0.93
34. Ohio, Poole, Winter	53.6	2.56	1.357	233.5	0.03
35. Baltimore, Red, Winter .	51.9	2.43	1.383	230.5	0.46
*36. Ohio, White, Winter....	51.4	2.40	1.387	235.5	0.87
37. Chicago, Spring........	47.8	2.25	1.377	236.	0.30
38. Wisconsin, Spring......	47.4	2.23	1.377	227.	0.14
*39. Washington State	45.7	2.23	1.327	224.5	0.49
40. Duluth, Hard, Spring ...	46.7	2.17	1.394	233.	1.37
41. Manitoba, Hard, Spring.	43.9	2.05	1.388	232.5	0.72
42. Duluth, Spring.........	40.5	1.90	1.380	227.5	2.15
Average	51.5	2.44	1.367	230.5	0.94

DISCUSSING THE TABLES.

IMPURITIES.

It is readily noticed from Table III, that Indian wheats (with one exception) especially all the Kurrrachees, contain an enormous percentage of useless material, mostly worm-eaten grains, also foreign seeds, and quite a number of grains in their husks. The latter feature is most probably due to the fact that India has, as a rule, not availed herself of the facilities of cleaning wheats ; however, the low percentage of impurities in New Choice Bombay seems to indicate that advances in this direction are being made.

Next to India in the amount of impurities in her wheats may be classed Russia. While the Baltic variety is almost free from foreign bodies, and most of the different Ghirkas (Spring Wheats) are comparatively clean, the Azimas (Winter Wheats) contain a high percentage of foreign material, especially an unusual amount of Rye grains, besides husks and weed seeds.

South America comes next to Russia in the scale. Rosario wheat, 1892, contains a considerable quantity of impurities, mostly chaff and grains in their husks ; but Rosario wheat, 1893, shows a remarkable improvement in this respect' and thus classes next to the Chili samples, which are the purest of the South American specimens. The rest of the South American samples are far from being pure wheats, but it would seem from other considerations to be mentioned hereafter, as though Patagonian and Entre Rios wheats occupy a place among the better wheats of the world.

Turning to the remaining countries, we find that English wheat (of which to my regret I have but two specimens on hand,) is almost free from foreign material, then follow Australia and New Zealand, and next the United States and Canada. California Choice strangely heads the list for impurities in American wheats ; it contains wheat stalks and unhusked grains even to a larger degree than California No. 1 ; this observation stands in contradiction to a statement to be found in the accompanying notes affixed by trade to the samples ; it would require more material, however, than I have at my command, to settle this point also to my own satisfaction. The Duluth samples contain weed seeds and oats, the rest of the United States and Canada samples are fairly free from impurities.

DENSITIES, ETC.

Although the values in Table II, Column 2, were established mainly for the purpose of creating a basis from which to calculate the percentage of impurities contained in wheat samples, they also stand in some connection with the densities given in Column 1 of the same Table. As both series express the weight of a given bulk of wheat, (Column 1 excluding and Column 2 including the interstices between the grains,) both should properly run parallel with each other, *i. e.*, a wheat specimen with a high density should align a high value in the second column.

On comparing Columns 1 and 2 in this direction it is found, however, that this rule holds good only in a general way, inasmuch as the densities in the first twelve specimens correspond with comparatively high figures of the second column, (which are nearly all above the average, 227.1 ;) and the last members, having lowest densities, also correspond with low values in the second column, e. g. Rosario, 1892, or Baltic. Yet, flagrant exceptions occur, e. g. Kurrachee Red, which ranks lowest in Column 2, (212.5 grains) where all its impurities of 19 per cent. are counted in, but has a rather high density in Column 1 (1.371,) where its bad grains and impurities are taken out ; and England, Red, which has a rather low density, (1.337,) but yields a comparatively high weight in the 20 C.c. dry measure.

Undoubtedly some variations occur in the dimensions of the interstices between the grains of different wheats, probably brought about by the combined influence of the shape of the grains and the narrowness of the small measure employed ; for it is obvious that in a small glass the influence of its walls on the arrangement of the grains is more pronounced than in a large vessel.

This circumstance may tend to render the figures in Column 2 less certain for the purpose of comparing them with the densities in Column 1.

Regarding Table III, it was stated before that the specimens of each country are classified according to the size of the grain, *i. e.* the space in C.c. which is occupied by 100 grains of each kind of wheat. Here the almost self-evident fact becomes manifest, that an increase in the size of a grain is accompanied, as a rule, by an increase in weight ; thus, with two exceptions, we see the values in the first column running parallel with those in column 2.

But the corresponding members of both series do not stand in exact proportion to one another. A grain having double the weight of another is not necessarily double its size, but is either a trifle less or a trifle more than double that size, and these conditions find a plain expression in the third column, showing a higher density in the first and a lower density in the second case.

The descending order of the values in column 1, Table III, is interrupted twice ; between Nos. 11 and 12, and between Nos. 39 and 40.

It will be noticed that in the first instance an increase in the weight of 100 grains is accompanied by a decrease in their space ; as a result, the density of No. 12 must be greater than that of No. 11, which fact is demonstrated in column 3.

In the second instance the same conditions rule, and the third column records a higher density for Duluth, Spring, Hard, than for Washington State.

These considerations serve to show that the values for the densities that are contained in column 3, Table III, or column 1, Table II, give us, at a glance, an idea of the degree of compactness prevailing in the structure of the wheat specimens.

Now if we take it for granted that in otherwise equal conditions a higher density indicates a better quality in wheat, such samples will naturally be most valuable as possess not only high weight and large size of grains, but also high density, for example New Choice Bombay, or No. 1 Club, Bombay; while others may have high weight and large size of grains and perhaps for this very reason small density, as England, Red, and the Chili samples. Again others, forming the antipodes to the latter kind, may have small weight, small size of grains, and high densities, as most of the American wheats: finally there are some that are both small in size and light in weight and also possess but low density; herein classes for example Rosario, 1892.

From this point of view all the specimens of wheat on hand may be grouped in the following table. The white wheats are characterized by the mark (*), and impurities greater than 3.5 per cent. by (†).

TABLE IV.

100 Grains of Wheat.	Large Volume, 3.94–2.68 C.c. High Weight, 84.2–60.8 grains.	Small Volume, 2.67–1.78 C.c. Low Weight, 60.7–37.5 Grains.
High Density. 1.394–1.377.	I. No. gr. d. *6. No. 1 Club, Bombay, India†. 84.2 1.385 *9. New Choice 72.1 1.377 *3. Australia 67.8 1.377	III. No. gr. d. 40. Duluth, Hard, Spring. 46.7 1.394 41. Manitoba, Hard, Spring. 45.9 1.388 *36. Ohio, White, Winier 51.4 1.387 35. Baltimore, Red, Winter. 51.8 1.383 19. Black Sea, Azima, Russia† 46.1 1.383 27. Patagonia, S. America 53.7 1.380 42. Duluth, Spring. 40.5 1.380 37. Chicago, Spring 47.8 1.377 38. Wisconsin, Spring 47.4 1.377
Lower Density. 1.376–1.320.	IIa. No. gr. d. *2. New Zealand, Red 60.97 1.358 *7. No. 1, Bombay, India†. 79.1 1.356 *8. Choice Bombay, India† 78.1 1.350 IIb. *1. New Zealand, White 77.8 1.346 *5. England, White 64.8 1.346 *31. California, Choice 74.4 1.343 4. England, Red 77.4 1.337 *23. Chili 77.8 1.332 *24. Chili 66.6 1.323	IV. No. a. gr. d. 13. Kurrachee, Red, White†. 54.2 1.371 28. Entre Rios 51.4 1.370 *12. No. 2, Calcutta† 54.9 1.368 *32. California, No. 1 60.3 1.358 15. Azima, Fine, Russia† 53.4 1.358 16. Odessa, Azima, Russia†. 51.9 1.353 *11. Kurrachee, White, India† 54.6 1.357 34. Ohio, Poole, Winter. 53.6 1.357 *10. Kurrachee, Soft, White†. 56.8 1.350 b. 22. Ghirka, Russia 37.5 1.371 18. Ghirka, Fine. Russia 49.3 1.364 17. Black Sea, Ghirka 49.5 1.360 29. River Plata, S. America. 46.1 1.357 c. 26. Rosario, 1893, Arg., S.Am. 54.2 1.346 25. Barletta, South America. 55.3 1.342 *33. California, Blue Stem 54.8 1.338 *14. Baltic, Russia 56.6 1.320 d. 21. Ghirka, Fine, Russia 42.7 1.345 20. Odessa, Azima† 42.9 1.343 30. Rosario, 1892, Ar., S.Am.† 43.8 1.331 *39. Washington State 45.7 1.327

Under the supposition which can be fairly held, that high density of the grains of a specimen of wheat on one side, and large weight and size of the grains on the other, are indicative of a good quality of wheat, Table IV should be considered in itself a general valuation of our samples, because it assigns each specimen a definite place according to its intrinsic properties.

The denominations by which the four compartments and their subdivisions are headed, not only serve to merely enumerate them, but also to express, from the stand herein considered, the different qualifications of the wheat specimens distributed in those compartments.

Thus the wheats are graded in the following descending order:

Compartment I—Large Volume, High Weight, High Density:—No. 1. Choice, Bombay, India;—New Choice, Bombay;—Australia.

A percentage of 4.7 per cent. impurities (see Table III) detracts somewhat, however, from the high rank which No. 1, Club, Bombay, holds in this classification.

Compartment IIa—Large Volume, High Weight, Medium Density, contains the New Zealand, Red, specimen, which thus follows the Australian sample—and two more select Indian wheats.

The foregoing would demonstrate that Australia and the better order of Indian wheats head the list of the wheats of the world as regards size, weight of the grain and specific gravity combined. While the density of New Zealand wheats (White and Red) is somewhat lower than that of Australia, its grains are larger and heavier.

Compartment IIb—Large Volume, High Weight, Low Density. Here are recorded New Zealand, White,—England, White and Red, then one specimen of American wheat (California, Choice,) of about equal quality, and the Chili samples, which seem to be of a rather loose structure, as they combine large sized, and therefore heavy grains with a very low density.

Compartment III—High Density, Small Volume, Low Weight. In this compartment the samples of the United States and Canada line up almost in a body; for of 12 samples examined, 7 are recorded here, while California, Choice, found its place before in Compartment IIb.

The members of Compartment III, are distinguished from all the other wheat specimens by taking the decided lead in density. Duluth, Hard, Spring, stands supreme as compared with every specimen of the entire series, having a density of 1.394.*

The list in Compartment III, also numbers two foreign specimens:—Patagonia, South America, and Black Sea, Azima, Russia—with high densities; the favorable valuation of the latter, however, is marred by a high percentage (8.9 per cent.) of useless material, (see Table III) mostly Rye grains.

It may be an open question whether a specimen of wheat coming under this heading is inferior in its standing to those under IIb, when special commercial purposes are considered; for example, a high specific gravity or density of the grain would seem to be an important factor in the purchase of wheat, under otherwise equal conditions, because the density of the grain stands in causal connection with the weight of wheat contained in the bushel; for the higher the density, the more weight there will be contained in the bushel, and *vice versa*.

Compartment IV—Small Volume, Low Weight, Lower Density. As the table demonstrates, this compartment is subdivided into four sections, a, b, c and d. It was deemed necessary to introduce this subdivision, because, since only the most prominent specimens were abstracted from the original bulk of 42 samples, and classified within Compartments I, II and III, there still remained many that had approached in their qualities the very best specimens taken out, and therefore deserve a higher qualification within Compartment IV.

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* It must be remembered that these figures are probably not *absolute*, but should be somewhat higher on account of the modifications in the determinations adopted herein for the sake of practicability. See for explicit description page 7. However, their value for comparison remains the same.

Of the Russian specimens, one, it was observed, found a place in Compartment III, on account of its high density. The rest of the samples are all contained in Compartment IV. It is seen that they possess comparatively high and medium densities, especially the Ghirkas, Spring wheats (Compartment IVb), which are also cleaner than the Azimas (Winter wheat). (See Table III.) Only one Russian variety (Baltic, white wheat) ranks decidedly low in density, having 1.320, the lowest of all the wheats. There is also one American white wheat (Washington State (Walla Walla) of low density, and of very little uniformity in size and weight of the grains. The results that were given of this specimen are the average values observed.

The table finally shows that the three Kurrachees and Calcutta belong to Compartment IVa, the subdivision approaching the higher compartments, as far as density and dimensions of the grain are concerned, but their valuation suffers on account of a high percentage of impurities, Calcutta containing less than the Kurrachees (see Table III).

The table also assigns a rather favorable place to California, No. 1.—Ohio, Poole, Winter,—but less so to California Blue Stem,—and least to Washington State, as mentioned before.

Regarding the rest of South American wheats besides Chili and Patagonia, it is striking to observe that Entre Rios holds as high a place as that in Compartment IVa (see page 147). Rosario, 1893, is far superior to Rosario, 1892, and Barletta is of about the same order as Rosario, 1893.

These are the general conclusions which may be drawn from the foregoing study, and in order to give the reader some opportunity to compare these results with the gradations accepted in commerce, I herewith affix the trade notes which accompanied the samples.

Descriptions of wheat made by Messrs. Smith, Hammond & Co., illustrating the various grades commerce would assign most of the foreign and some of the native wheats of this study.

Australian—New Zealand. Finest all round Wheat, combines high yield, fine color and fair strength. Loss in cleaning, small; mills well.

Bombay.—Stands first of Indian wheats, and used freely for adding color to strong Reds, about the most useful wheats for mixing; their dry starch and somewhat inelastic gluten and gray starch of Azimas and Ghirkas also adds to the high quality of fine Duluth when judiciously mixed.

Choice.—Is exceptionally fine, impurities few, and all round qualities many. Structure may be called "flinty." When carefully prepared (washed) goes to the mill soft and yields a higher percentage of flour than any other White wheat, except Australian. Flour splendid in color and bloom, moderate in strength, absorbing well, but wanting in retaining power. More flavor than Californian or Chilian.

No. 1.—Similar wheat, but with higher percentage of impurities, takes more cleaning. Flour equal in quality but less in quantity than that made from Choice.

Calcutta Wheat.—Usually lower in gluten than Bombay, and consequently weaker. Very hard to dry.

Kurrachees.—Recent improvements in machinery for stoning, drying and conditioning have enabled these wheats to be used in greater quantity than deemed possible ten years ago, and are used largely by inland and country millers to take the place of Native and American wheats.

White.—The most useful and used of the lower grade of Indian wheats, well worth the trouble of cleaning.

Red.—Mills well; yields a fair percentage of clear bright flour, and stronger than the White.

Ghirkas, Russia, Spring.—Azimas, Russian, Winter.—Variable in quality, on account of being mixed with sprouted Grains, Rye, etc., but intrinsically good wheats, and sell relatively cheap; the great feature being the grey starch and tough gluten, the percentage of the latter being higher than most American Springs, used largely for mixing with Californian, Indian and native wheats.

Chilian.—Variable in quality; more soft than brittle; resulting flour dead white color, without bloom or quality.

River Plata, Rosario, Barletta, Entre Rios, Patagonian.—These South American wheats, similar in quality to our Red Winter wheats, some varieties are hard and show great strength, fewer impurities than 2 Red Winter, therefore better yield, and supplanting American wheats, on account of relative cheapness.

Choice California.—Dry, soft wheat; fine color, high yield; very little impurity in shape of dust or short straw. Gluten lower than the finest English; on account of dryness considered stronger.

No. 1, *California.*—Fine Middlers wheat, impurities greater than Choice, resulting flour when cleaned, white and clear, and good quality. It is very brittle wheat, a great favorite, especially with country millers, for mixing with damp native wheat.

Walla Walla.—Same characteristics as Californian, but less strength. Flour—clear yellow color: generally used with other wheats to give bloom to grey flour.

RECAPITULATION.

PART FIRST. THE GRAIN WEIGHT.

Standard modern dictionaries and other authorities inform us that the grain weight was established in England 600 years ago from the weight of carefully selected wheat grains. (Webster, Pasley.)

From these statements an inference might be drawn, as though the average wheat grain should equal a grain in weight. Experiment shows, however, that it is exceptional for a grain of wheat to weigh as much as a grain.

This seeming contradiction is readily explained by the historical fact, viz., that by statute of King Henry III. (1266), it was enacted that 32 grains of wheat, from the middle of the ear, well dried, should weigh a pennyweight; and that in 1497, by statute of King Henry VII., this standard was changed, inasmuch as the same pennyweight was then sub-divided into 24 grains. (See Johnson's Cyclopedia.)

Thus until 1497, 32 average grains of wheat weighed 32 grains, providing grain-weights were then employed, but after the enactment of Henry VII., the 32 grains of wheat weighed but 24 reconstructed grains. Since then the grain standard, so far as I can determine, has suffered no further change. 100 average grains of wheat should therefore weigh 75 grains.

In comparing with one another the weights of 42 separate lots, each of 100 grains, from specimens of wheat from different countries, (Australia, England, India, Russia, South America, United States and Canada), the general average in the weight of wheats from all the aforenamed countries (see Table I.) was found to be far below the given standard, it being only 60.87 grains. However, an average of the heaviest of the specimens, one from each country, came very close to that of the original standard, viz., 74.734, instead of 75.00 grains.

This would seem to show that cultivation and climatic conditions during a period of 600 years have exercised but little, if any, influence on the weight of selected wheat.

PART SECOND—ECONOMIC.

A few experimental comparisons between the different wheats were made on the following basis:

1.—Determination of impurities. (See Table II., column 3, and Table III., column 5.)

2.—Determination of densities (see Table II., column 1, and Table III., column 3) involving, *a*, Determination of the weight of 100 grains of each wheat specimen (see Table I., and Table III., column 1), *b*, Determination of the volume of the same 100 grains. (See Table III., column 2.)

I.—According to the amount of impurities in the weights, the averages from each country are: (See Table III.)

	Average.	Maximum.	
England	0.07 per cent	0.15 per cent.	England, White.
Australia and New Zealand	0.37 "	0.65 "	New Zealand, Red.
United States and Canada	0.94 "	2.61 "	California Choice.
South America	2.92 "	7.97 "	Rosario, 1892.
Russia	5.15 "	11.68 "	Odessa, Azima.
India	9.18 "	19.42 "	Kurrachee, Red.

Further particulars on the subject of impurities are recorded on page 147.

II.—As regards density and size and weight of the grains in general, it can be demonstrated from Table III., that while the weights of the different lots of 100 grains seemingly run parallel with the spaces they occupy, the members of these two series do not stand in exact proportion to one another; as a consequence, the densities are variable, which is seen in Column 3, Table III.

White wheats (marked *) are usually large in size and weight, but inclined to be low in density. (Compare Tables I. and II.)

III.—If we outline a tabulation of our wheats by intersecting gradations in their densities, with gradations in the dimensions (size and weight) of their grains, we arrive at a classification of these 42 samples, which assigns each specimen a place according to its intrinsic value. From Table IV. thus obtained, we draw the following general conclusions:

Australian and New Zealand wheats (3 specimens), and some Bombay samples, combine high weight and large size of grain with high density, and thus rank first in the list.

Then follow England (2 samples), California, Choice, and last Chili, which has lowest density combined with large size and high weight.

The bulk of the United States and Canada samples belongs to the class with small size, low weight, but high density of the grain. One American specimen (* Washington State, Walla Walla), ranks low in Table IV.

Patagonian wheat and Black Sea, Azima, Russia, class with the American samples of high density.

The rest of all the Indian and Russian wheats occupy a medium position in Table IV. Special mention is due perhaps to the Ghirkas (spring wheats) for their comparative superiority of station within the table; they are also cleaner than the Azimas (winter wheats). Also Entre Rios, South America, deserves our attention. More detailed conclusions are to be found appended to Table IV.

The foregoing paper in its second part is intended to be only a preliminary study, with a view of continuing it in a future paper. The urgency of the occasion (the work having to be done in August in order to reach this meeting) did not permit me to step beyond the simple methods of manipulation which are described in the previous pages. Thus the values for the densities observed are not claimed to be absolute, and future determinations with improved methods will probably raise the series as a whole; but, having herein scrupulously maintained uniformity in observation, I feel justified in utilizing the results obtained to draw the conclusions already recorded. (I regret that for want of space in making up the form, the use of small type was there necessary.)

In the future paper I propose to include a comparison of results by the different methods which may be employed to determine the densities of wheat, also some interesting developments which could not be included here, viz., regarding the density of the individual wheat grains, as compared with the average of that of selected bulks of wheat.

The future paper will also dispense with the antiquated denomination of weight (grain), which was partly employed herein by necessity, owing to the nature of the subject introducing this paper.

THE CHAIRMAN: I had the pleasure two years ago of attending a meeting of the British Pharmaceutical Congress, and I noticed one feature of the meeting which I admired, to allow the Chairman of the meeting after the reading of a paper to call upon any member he chose to reply or follow the paper. I do not propose to do that; but in this case, in order to facilitate our work, (I am a little nervous about getting the number of papers through) I would like to call upon Prof. Oldberg, for a five minutes' talk upon this paper.

MR. OLDBERG: I do not think the time of the members of this Association ought to be taken up with the details of this subject at this time. It just occurred to me a few moments ago, however, and I mentioned it to the Professor, that I had seen somewhere a table of the different kinds of grain that had been used in different countries. I mean not the weight represented by the wheat grains, but I mean the grain weights existing—therefore it seems to me it would be hardly profitable to collect any more grain weights, especially as we do not know whether the grain was like the grain we have to-day—the grain of six hundred years ago.

MR. EBERT: I would like to ask Mr. Lloyd, when taking the specific gravity of these grains of wheat, whether he dried them or simply took them at random—did you bring them to any standard of dryness?

Mr. Lloyd: In reply to Mr. Ebert, I would say, I took the grains of wheat as I found them in the market; I selected and counted one hundred grains of the average size, placed them side by side, and they were dried in the drying-room.

Mr. Ebert: I want to say, Mr. Chairman, this is a point that should be observed with quite a good deal of accuracy. In the matter of grain I have had a great deal of experience individually in regard to the moisture of the different grains. For instance, you will find from 11 to 15 per cent. of moisture in wheat and from 9 to 13 per cent. in corn, and you will have to analyze each sample you take after it has been carefully dried, and you will find that the variation is so great that it makes a great difference in the weight.

Mr. Lloyd: Allow me to add, that not only can I support Mr. Ebert's criticism, but you will also find a great difference in the same wheat in the same head, whether from the base, the head, or the thick of the spike—this is referred to in the paper and should be the subject of further investigation.

Upon motion the Section adjourned, to meet again at 9 : 30 the following morning.

Second Session—Thursday Morning, September 6.

The session was opened at 10 o'clock by the Chairman, Mr. Sayre, who announced as the first order of business, the election of officers of the Section for the ensuing year. The Secretary being requested to announce the nominations made at the previous session, read the following names: For Chairman—Mr. Schlotterbeck, Mr. Holzhauer, Mr. Kremers. For Secretary—Mr. Kauffman, Mr. Beal, Mr. A. R. L. Dohme.

The Chairman: According to the rules, I believe further nominations are in order. Therefore, if it is your pleasure to make other nominations this morning, your Chairman will be pleased to receive them at this time.

Mr. Good: I would like to nominate Prof. Simon.

Mr. Simon: I thank you for the honor, and desire that my name be withdrawn, because I shall most likely be in Europe.

The Chairman: That raises an important point. It is necessary for us to know whether the gentlemen nominated will be in Denver next summer, or will agree to be there. I believe there is another point to consider, and I would like to ask for information in regard to the nominees; whether it is known that they will accept these positions. Mr. Kremers, for instance, is not in attendance; Mr. Holzhauer is present, and Mr. Schlotterbeck. The only question now is in regard to Mr. Kremers. If there is any one here who can give me any information in regard to that matter, I should like to have it, or whether they will refuse to serve.

Mr. Ebert: There is enough material here for the purpose of filling the chairmanship, and it is unwise not to do so because we want to honor some one. What we want is some one who will accept, who knows what we have been doing, and is familiar with the work, so that he will give us next year the work to do. This fashion of conferring honor because some one is a clever fellow ought not to be continued; we ought never to consider that. We should try to promote the welfare of the Association, and there should be no individuality in regard to the matter of selecting, but we should pick out a man who will promise to do what is right. Just look at the Commercial Section. When we came here yesterday they wanted two days with nothing before them.

THE CHAIRMAN: I rather object to any remarks that may be misinterpreted.

MR. EBERT: I am trying to illustrate the conditions we get into sometimes by the use of wrong methods, which do not help the Association, but rather tend to hinder the work. If it is right and proper that we should come here for a thousand miles, any one who will accept this position ought to have it—any one who will do the duty—and if not, do not confer any favors.

MR. WHELPLEY: I believe it pertinent to inquire of the candidates, and I agree with the timely remarks of Mr. Ebert. I for one do not believe in taking special pains to elect some one who is not here unless an extreme necessity should exist for it. It makes us appear as though we were anxious to confer favors upon certain individuals. I move that inquiry be made of the candidates of this Section—namely, ask them if they expect to attend the Colorado meeting, and then we can proceed to the election of Chairman.

The motion was duly seconded and carried.

THE CHAIRMAN: The only thing we can do under the circumstances is to postpone the election, because the nominees cannot be asked the question until later in the day. What is your pleasure, shall we pospone the election until later? One of the nominees being so far away that we can only get intelligence by a telegram.

MR. WHELPLEY: That was not the intent of the motion. I did not propose that we should telegraph all over the country to know whether the candidates were going to be in Denver or not.

THE CHAIRMAN: I misunderstood the motion; the intention then is that nominees are to be present. The Chairman would ask as to Mr. Holzhauer, one of the nominees.

DR. ECCLES: We have had a Chairman here who has done excellent work. I do not know whether his name can be brought forward again, but I think the good work done by Prof. Sayre is such that we should try to have him fill the position for another year. I would therefore put in nomination L. E. Sayre.

MR. WATSON: I would like to say that there are a great many here who would be glad to have Prof. Sayre Chairman of the Section on Legislation.

DR. ECCLES: Under those circumstances I wlll withdraw his name.

The Chairman then inquired of Mr. Holzhauer, whether it was his intention to be present at Denver, and he replied that as far as he could say now, that it was his intention to attend the meeting at Denver, and all the sessions of the Association, but of course he could not state whether he would be there.

Dr. A. R. L. Dohme, of Baltimore, was then nominated for Chairman of the Scientific Section.

Mr. William C. Alpers was nominated for Secretary.

MR. ALPERS: I thank the gentleman very much for the honor, but I beg him to withdraw my name, as I do not desire any office, and prefer to be on the floor.

THE CHAIRMAN: The nominees for Secretary are George B. Kauffman, Columbus, Ohio; J. H. Beal, Scio, Ohio; Alfred R. L. Dohme, Baltimore; and William C. Alpers, Bayonne, N. J.

MR. ALPERS: I beg to withdraw my name.

The nominations were then closed.

THE CHAIRMAN: Mr. Kauffman, will you state to the Association whether you intend to be present at the meeting next year in Colorado?

MR. KAUFFMAN: I shall be there if I am able to be.

THE CHAIRMAN: Mr. Beal, will you be present?

MR. BEAL: I expect to be present at the next meeting of the Association.

THE CHAIRMAN: You will please prepare your ballots for Chairman. The names of the candidates will now be read.

THE SECRETARY (reading): J. O. Schlotterbeck, Ann Arbor, Mich.; Edward Kremers, Madison, Wis.; Charles Holzhauer, Newark, N. J.; A. R. L. Dohme, Baltimore, Md.

Dr. Dohme's name was withdrawn as a candidate for Secretary, having been nominated for Chairman.

MR. DADD: I understand the name of Dr. Kremers was presented. There has been an objection raised on account of his not being here. I would say that I think it very probable Mr. Kremers would take the position if it was offered to him. I further say there is no better man could be selected for the position than Mr. Kremers. Every member of the Association has knowledge of him. He is one of the purest men, and I would endorse him as such, and he would represent this Scientific Section fairly, and no better man could possibly be selected anywhere.

THE CHAIRMAN: I think every member of the Association will endorse those remarks. The one thing that has been brought forward is this: there is a question whether Mr. Kremers will accept the position.

MR. DADD: I am certain that he will feel highly honored.

THE CHAIRMAN: Every member will recognize the value of such a member.

MR. DADD: He will feel honored by the nomination. We have telegraphed him, but have not received an answer up to the present time.

MR. EBERT: I would like to ask Mr. Dadd to withdraw Mr. Kremers' name under those conditions. I would not like to see Prof. Kremers' name brought up and defeated simply on the ground that he is not here, and we are obliged for the good of the Association to vote only for a man that we absolutely know is going to accept, and is going to be with us; for that reason I hope you will withdraw his name, because I would not really like to see Prof. Kremers placed in that position.

MR. DADD: I do not want to do anything of the kind, but I do want to do all I can to help this department along, being considerably interested in the department of Pharmacy, and in its ethical position particularly. If we had any certainty or knowledge that Mr. Kremers would not take the position, I would not like to hold his name in abeyance here.

MR. OLDBERG: Mr. Ebert has just taken the words out of my mouth. As I nominated Mr. Kremers, I feel constrained to say I do not desire to see his name voted upon with the chance that he would be defeated, because he is a man who needs only to be nominated to be elected. He ought to be nominated on account of his purity, and that is the reason I nominated the gentleman, and would like to see him elected; but when there appears to be a doubt and an impression that he will not serve, and the fact being that he is not here, I will withdraw his name.

MR. WHELPLEY: I think, further, that it is more than likely he would be defeated. We have others equally prominent and seviceable for the position, who really and positively will attend.

MR. SHEPPARD: I was just going to speak along that line; Mr. Kremers is the man we want, and we want him unanimously elected; he is one of those men like Charles Rice, of New York. We want a man who will go to Denver, and we have a man in Dr. Alfred Dohme, who is sure to go to Denver, and will be just the right kind of a man for the place. I believe I also nominated Mr. Kremers, and I ask the privilege of withdrawing his name.

THE CHAIRMAN: The Chair will give that privilege if the Association consents; if there is no objection the name of Mr. Kremers will be withdrawn.

MR. SCHLOTTERBECK: I ask that my name be withdrawn, for this reason: although I have been a member of this Association five years, I think that Dr. Dohme and Mr. Kremers have done more work than I have.

MR. EBERT: I move that the gentleman be allowed to withdraw his name.

THE CHAIRMAN: If there is no objection, as I understand the position, the Chair will allow the name to be withdrawn.

MR. WHELPLEY: Now, who are the candidates for Chairman of this Section?

THE CHAIRMAN: I will announce as the tellers Henry R. Slack and Dr. H. M. Whelpley. The names of the candidates will be read by the Secretary.

THE SECRETARY (reading): The names of the candidates are: for Chairman, Charles Holzhauer, Newark, N. J.; A. R. L. Dohme, Baltimore; for Secretary, George B. Kauffman, Columbus, Ohio; J. H. Beal, Scio, Ohio.

THE CHAIRMAN: Is it the pleasure of the meeting to ballot for these candidates at the present time?

MR. BEAL: My name has been presented without my knowledge and consent, and while I feel honored by having my name placed in nominatlon, I desire that my name be withdrawn in favor of the other gentleman who has been nominated for the same position; and if in order, I would move that his election be made unanimous.

MR. WHELPLEY: I will second the motion, and in order to conform to the Constitution I would add as an amendment that the Secretary be instructed to cast the ballot of the Association for Mr. George B. Kauffman.

MR. SHEPPARD: Do we not elect our Chairman first?

THE CHAIRMAN: If it is the pleasure of the meeting in regard to this, the strict order can be departed from.

The question being called and taken, it was agreed to, and the Secretary cast the ballot of the Section for George B. Kauffman, of Columbus, O., for Secretary.

THE CHAIRMAN: We should now proceed to the election of Chairman.

MR. SHEPPARD: I would like to inquire whether Mr. Charles Holzhauer intends to be at the meeting in Denver?

MR. EBERT: Mr. Holzhauer has been heard from, and he has made a statement, that he is going to be in Denver next year.

THE CHAIRMAN: Dr. A. R. L. Dohme and Mr. Charles Holzhauer are the nominees. You will please prepare the ballots. If there is no objection the Chair will rule that the reading of the minutes of the last meeting be omitted, and we will proceed to the reading of papers. Our time is limited; we have forty-one papers, and we ought to be just to the persons who have written the papers.

THE SECRETARY: While the ballots are being prepared I would like to announce the names of the Committee on the Chairman's address. The names are: Dr. W. Simon, Baltimore, Md.; L. Myers Conner, Dallas, Texas; Leo Eliel, South Bend, Ind.

THE CHAIRMAN: I would like to suggest that the paper by J. B. Nagelvoort mentioned in the address which the Committee are expected to review, be furnished to the committee in connection with the Chairman's address.

Dr. H. M. Whelpley announced the vote for Chairman as follows: Total number of ballots, 78; Dr. A. R. L. Dohme, 52; Mr. Charles Holzhauer, 26.

Dr. Dohme having received the highest number of votes cast, was declared elected.

THE CHAIRMAN: I think it is fair to assume that the election is unanimous. The Secretary will please announce the officers for the ensuing year.

THE SECRETARY: The officers for the ensuing year are: Chairman—Dr. A. R. L. Dohme, Baltimore, Md.; Secretary—Mr. George B. Kauffman, Columbus, O.

DR. WHELPLEY: Do they select their associate?

THE CHAIRMAN: They will select their associate, and will announce the name of the gentleman later on. I will now call for the reading of the next paper, upon "Microscopical and Chemical Examination of Cloves," by Henry Kræmer.

The paper was then read by the author.

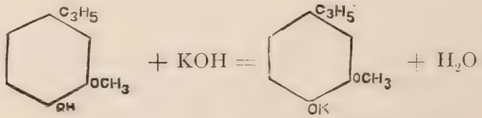
A MICROSCOPICAL AND CHEMICAL EXAMINATION OF CLOVES.

BY HENRY KRÆMER.

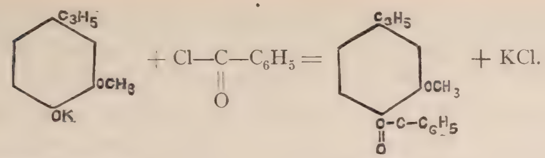
More than a year ago, a sample of a spice was submitted to the author, an examination of which revealed the presence of a large quantity of starch. The question was then asked: "How much is there of this adulteration?" A quantitative answer was desired without a chemical analysis. This was the beginning of the present work, and very naturally the thought arose, Is it possible to obtain quantitative as well as qualitative results with the microscope? The results are embodied in this paper—which is intended, however, merely as a preliminary paper—on the comparison of quantitative microscopical with chemical examinations, and it is hoped will reveal the possibilities of research in this direction. At the same time are given the results of analyses of some commercial samples of clove oil and cloves by Thoms' method (with perhaps a slight modification) of determining the eugenol in the form of a benzoyl compound.

Extraction of Oil from Cloves.—10 Gm. of the powder were mixed with 10 Gm. of dried calcium sulphate, wrapped in filter paper and extracted in a Soxhlet apparatus by means of petrolic ether. Some of the ether was recovered, and the remainder was siphoned off by means of a siphon and a suction of air. The oil thus obtained had a viscous appearance, and on the addition of alcohol about 0.16 per cent. of a white resinous compound separated, which on the filter assumed the form of a very fine gauze. To this filtered solution from 8 to 10 C.c. alcoholic potash solution (1 C.c. = 0.09856 KOH) were added. The alcohol was removed on a water-bath, and to the nearly dried mass from 2 to 2½ C.c. of benzoyl chloride were added. The mixture, in a flask similar to that in which the extraction had been made, was stirred with a glass rod until the reaction was complete. Water containing some KOH was then added, and the whole heated on a water bath for a few minutes, then removed and placed in ice water, and when cooled the clear liquid decanted, and if there were any floating oily particles, these were removed in a separatory funnel by means of ether. This washing was continued 3 or 4 times, and finally the benzoyl eugenol was separated from the water by means of a separatory funnel with ether. The ether was evaporated off (assisted by siphoning the vapor and the use of the suction of air). The mass on cooling crystallized. These crystals were dissolved in 15 C.c. alcohol (90 per cent.), heated to solution and recrystallized by placing in ice water and shaking the flask repeatedly. The solution was decanted and filtered through a small filter from the crystals, and the latter simply washed with an additional 15 C.c. of alcohol (90 per cent.). The crystals in the flask with filter paper were dried at 100° C. and weighed.

1 Gm. eugenol requires .341 Gm. KOH.
1 Gm. " " .693 Gm. benzoyl eugenol.
5 C.c. alcohol (90 per cent.) will dissolve .110 Gm. benzoyl eugenol.



Eugenol. Potassium Eugenol.



Potassium Eugenol. Benzoyl Eugenol.

Thoms has worked out an algebraic formula for hastily calculating the results, which may be translated as follows:

$a =$ weight of benzoyl eugenol.
$b =$ weight of oil taken.
$c = +0.110$ Gm. for every 5 C.c. of alcohol used (being the weight of benzoyl eugenol dissolved in 90 per cent. alcohol).
$x =$ per cent. of eugenol.
Molecular weight of eugenol $= 164$.
Molecular weight of benzoyl eugenol $= 268$.
Then:

$$268 : 164 = (a + c) : \text{weight of eugenol}.$$

$$\text{Weight of eugenol} = \frac{164(a - c)}{268}.$$

$$b : \frac{164\,(a + c)}{268} = 100 : x.$$

$$x = \frac{164(a - c).100.}{268b}$$

$$x = \frac{4100(a+c)}{67b}.$$

The following results have been obtained by this method from the commercial samples of powdered cloves and clove oil:

Powd. Cloves.	Per cent. of oil.	Per cent. Eugenol.
No. 1	17.50	59.74.
" 2	17.75	60.45.
" 3[1]	12.75	66.16.

Clove Oil.	Per cent. Eugenol.
No. 1.	76.06.
" 2.	78.12.
" 3.	83.45.

Coming to the subject of quantitative microscopical analysis, while accurate results may be possible, so far only approximate figures have been obtained. These may not be without interest and value. and it seems probable that an analyst, who is able to use the microscope, may by a few moments' careful examination obtain evidences that will materially aid him in subsequent chemical analysis. Regarding the statements made by some that "the results of microscopical examination are not always uniform," I must refer them to the non-conformity in results of analytical chemists in organic and even inorganic analyses, unless by practice the individual masters the difficulties. And again it has been recently said, "that in the case of the deterioration of vegetable drugs through atmospheric influences or age, as well as in the adulteration of a genuine with inferior drugs, the difficulty of determining with the microscope the respective extent of change or adulteration is almost insuperable." This may seem to be so, and while chemical analysis is necessary, still there are many cases where the quantitative determination of admixtures and adulterations, if they are to be determined, can be done so only by means of the microscope.

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[1] This sample was determined by the microscope to contain powdered clove stems, although sold by a large house in New York as powdered cloves.

It would not be a hard matter to prepare a lengthy paper on the difficulties attendant upon research in this direction. Was there anything more difficult a few years ago than the study of bacteria? Not until Koch devised a convenient and comparatively easy method for this kind of investigation did this department, which to-day is recognized as a branch in science, become so popular. Even the medical student of the first and second year is taught to recognize and diagnose the insignificant Bacillus tuberculosis.

As has been said before, this paper is but a preliminary one, and while I have been at work upon the subject for some time, the work has been done under rather disadvantageous circumstances, and it is presented at this meeting to elucidate a principle, and present the results of what may be an incomplete method, for your consideration. The method of procedure is as follows: A measured quantity (about .200 Gm.) of substance is thoroughly mixed with a measured amount (2 or 3 C.c.) of water. One, two or three drops of this mixture formed on the finger are placed in the slide and covered with a cover-glass. In the eye-piece of the microscope is slipped a piece of glass corresponding to an ocular micrometer), containing 100 square Mm. By a little practice a slide may be prepared that is fairly uniform, or uniform places upon it may be selected. This being done, then a count is made of the number of starch grains, fibres, or characteristic tissue in the spurious substance, contained in 100 square Mm., and the same compared with a genuine sample. For instance, mixtures were made of genuine cloves with potato-starch, wheat-starch, cedar-wood, turmeric, and it was observed that quantitative relations by comparison, do to some extent hold even in this crude way of procedure. In determining the oil a slightly different method was pursued.

I. A sample of pure potato starch was examined and 100 $(\mathrm{Mm.})^2$ was found to contain $(32 + 28 + 32 + 35)$ 127 starch grains. Another 100 $(\mathrm{Mm},)^2$ contained $(32 + 30 + 28 + 30)$ 120 starch grains.

II. A sample of powdered cloves admixed with 50 per cent. of potato starch yielded the following results:

(1) (14 + 15 + 12 + 15) 56 grains = 45.34 per cent.
(2) (13 + 11 + 18 + 13) 55 " = 44.53 "
(3) (17 + 16 + 16 + 13) 62 " = 50.20 "

III. A sample containing 30 per cent. of potato starch:

(1) (10 + 10 + 11 + 11) 42 grains = 34.00 per cent.
(2) (7 + 10 + 11 + 8) 36 " = 29.14 "

IV. A sample containing 20 per cent. of potato starch:

(1) (7 + 8 + 7 + 8) 30 grains = 24.29 per cent.
(2) (7 + 6 + 9 + 9) 31 " = 25.10 "

V. A sample containing 10 per cent. potato starch:

(1) (4 + 2 + 3 + 2) 11 = 8.90 per cent.

VI. A sample of pure red cedar yielded the following:

(1) (10 + 10 + 8 + 9) 37 fibres to 100 $(\text{Mm.})^2$.

VII. Cloves containing 20 per cent. red cedar yielded:

(1) 7 = 18.91 per cent.
(2) 9 = 24.32 "
(3) 8 = 21.60 "

VIII. Cloves containing 10 per cent. red cedar yielded:

(1) 4 fibres = 10.8 per cent.
(2) 3 " = 8.10 "

All of the above results were obtained by using ¼-inch objective. In the examination of turmeric ½-inch objective was used.

IX. Turmeric pure using one part of water:

(1) (11 + 11 + 6 + 5) 33 grains.
(2) (7 + 8 + 6 + 5) 26 "
Average × 2 = 59 "

X. Cloves containing 10 per cent. turmeric using 2 parts of water:

(1) 10 = 16.94 per cent.
(2) 11 = 18.64 "
(3) 10 = 16.94 "

While the above results show a variance, and one that is not constant in any one direction, still they are of some encouragement. Hoping that the possibilities of this kind of research was not limited to mechanical admixtures, the author experimented with the view of obtaining quantitative results upon the oil contained in cloves. For this purpose a small extractor, graduated to a mark, was made out of a piece of glass tubing. This was filled to the mark with cloves and exhausted with ether, the whole operation requiring about one minute. The ether containing the oil was allowed to drop in a watch crystal containing a few drops of alcoholic KOH solution, the potassium eugenol forming at once and the ether evaporating. To the residue was then added a known quantity (2–3 C.c.) of water, the mixture thoroughly stirred, and a drop of the liquid collected on the finger and used on the slide. 25 $(\text{Mm.})^2$ were examined and the number of $(\text{Mm.})^2$—approximately—filled with crystals were counted.

XI. Pure sample of cloves:

$$\left.\begin{array}{ll}(1) & 9.\\ (2) & 6.\\ (3) & 9.\end{array}\right\}\ \text{Average} = 8 = 17.50 \text{ per cent. of oil.}$$

XII. Sample containing 50 per cent. of cloves contained:

$$\left.\begin{array}{ll}(1) & 4.\\ (2) & 3.\\ (3) & 4.\end{array}\right\}\ \text{Average} = 3.667 = 8.021 \text{ per cent. oil.}$$

Three commercial samples were examined, one that was said to contain much allspice. An examination based on the "port wine" cells of allspice yielded the following results:

XIII. Genuine allspice sample yielded:
$(5+9+3+3) = 20$ "port wine" cells.

XIV. Commercial sample gave:
$(3+3+4+3) = 13$ "port wine" cells $= 65$ per cent. allspice.

A sample supposed to contain a large amount of wheat starch yielded a surprisingly small amount comparatively, as was shown conclusively on comparing with pure mixtures of wheat starch and cloves.

XV. Pure sample of wheat starch contained:
$(69+68+67+69)$ 273 grains.

XVI. Sample of cloves containing 25 per cent. of wheat starch:
$(16+19+16+18)$ $69 = 25.28$ per cent.

XVII. Sample of cloves containing 10 per cent. of wheat starch:
$(13+9+7+10)$ 39 grains $= 14.32$ per cent.
$(9+7+9+8)$ 33 grains $= 12.0$ per cent.

XVIII. Commercial samples, adulterated with wheat starch:

$$\begin{array}{llcr}(1) & 100(\text{Mm.})^2 & = & 18\\ (2) & \text{"} & = & 24\\ (3) & \text{"} & = & 28\\ (4) & \text{"} & = & 24\\ & & 4) & \underline{94}\\ & & & 23.25\end{array}$$

The sample contained therefore 8.52 per cent. of wheat starch, probably 10 per cent.

XIX. Commercial samples with a slight clove odor. Under the microscope this revealed the presence of clove stems and starchy material. It yielded scarcely any potassium eugenol, but a green-colored liquid to ether. This sample showed adulteration, and either an extraction of oil by distillation or loss of oil.

Any one who has labored with microscopical work for other than mere pleasure can readily comprehend the difficulties that must have been overcome by the author in this investigation thus far. And they who will attempt to corroborate these results or do original work in this direction, must not be disappointed if results are not at once forthcoming. "Nature is taciturn, and we must wrench her secrets from her." But after these secrets are well obtained and the way discovered, the work is not so difficult.

The author hopes to elaborate upon the principles contained in this article, and that by similar methods, especially extraction and microchemical tests, the more important plant constituents even may be determined in a quantitative manner. Smaller squares than Mm. may be employed. Instead of tests being made upon a few milligrams of material, several grams should be used to obtain more uniform results. It is believed that by preparing carefully a series of powders with the adulterants, fairly accurate results may be obtained—certainly sufficient to determine approximately the extent of adulteration without recourse to elaborate and prolonged chemical analyses. By employing the most accurate methods of sampling in use in the assay laboratory, samples must be obtained that are representative. Enlargements by photomicrography, and subsequent cutting out and comparing by weight the tissues printed and the part remaining may be of service. Finally, much time must be yet devoted in ascertaining the real and permanent value of quantitative microscopical results to that of chemical results. It is hoped that many will pursue similar lines of research.—*School of Mines, Columbia College.*

THE CHAIRMAN: This has been a very interesting paper, and merits a discussion which might last a good while. It seems to me that the Chair must hold to one point, and that is, he must limit the remarks to five minutes.

DR. SIMON: Mr. Chairman, This paper seems to me to be one of more than usual interest, not so much on account of the work done, but on account of the fact that we have here introduced for the first time a method that has not been applied to any extent in the field of quantitative analysis or estimation. In making this statement I desire not to be misunderstood, knowing well that we have used the microscope in the determination, say, of the diatome in infusorial earth and other matter, and we have used the microscope to determine the weight of the blood corpuscles; but as far as my knowledge goes, no attempts have been made heretofore to use the microscope actually as what we might call a micro-balance in the field of analytical work—and the merit of this paper, I repeat, is the opening of this new field to the investigator. I do confess that the results so far are far from absolute exactness, but we should remember that every new method requires working out, not by an individual, but by a number of men, and by such hearty co-operation on the part of many, I have no doubt that this method will be one that is applicable not only to the instances mentioned by the author, but may be one which will be used in many fields and widen out the sphere of our labors. We are scientists, and so far have not been able by chemical means to make exact quantitative determinations. It may be possible that even in cases where substances are to be precipitated from solutions by chemical means, the quantity may be determined microscopically, and

I think that this will refer more especially to amorphous rather than to crystalline precipitates, because the crystal is bound to grow and change in weight, and even in the amorphous body precipitated from a solution there may be some difficulty because the size of the precipitated granule varies with the density of the liquid used. But all this has to be investigated, and I, for my part, think that we ought to be very much indebted to Mr. Kræmer for presenting to this Association an actually new method of investigation, and I hope that many will co-operate with him to make this work a success in the future.

DR. ECCLES: I would like to ask whether any attempt to estimate and to determine the difference between the qualities of different growths in different countries has been made, and whether such a determination was made to find out whether the proportion in samples of which he makes the test is uniform.

MR. KRÆMER: It would take me about ten years to do that. Dr. Eccles apparently don't realize the fact that I have only been working 18 months on this matter. I have thought of this thing, every spare moment I have possessed myself of, and I am thankful for the results I have obtained. I merely want to say that these are comparatively few. I have worked very hard at this snbject, and have ascertained that there is little difference between any commercial samples I have obtained. There is not much difference in cloves ground—there is very little difference. If you have a comparison to make and you want to make a comparison with the clove, in which you put the starch, you will find that you have relations corresponding. I only give this paper at this meeting as a subject for thought. It revealed a great deal to me, and I feel sure—I ought not to say that probably—it is very simple and the results will be forthcoming.

MR. LLOYD: I would like to ask a question of those who use a microscope. The microscope, it seems to me, might be used to a greater extent. I have seen, I am quite sure, good results from its use in establishing the relative value of filters. They have a method of maintaining a number of organic growths which are allowed to pass through these filters at different periods.

MR. WHELPLEY: Mr. Chairman, that is true, as are some other points in the same line of work, that the author of this paper pointed out. For instance, the determination of vegetable growths, bacteria, and the number of blood corpuscles, but this application shows that the author is entirely on a new line of work. It makes an application of the microscope, that we have not heretofore realized to be valuable, and it is certainly one in which every person who has ever attempted the examination of powdered drugs must be intensely interested in. For one, I desire to go on record as sincerely thanking the author of this paper, for the thoughts he has presented as a new inducement for microscopical work in the determination of powdered drugs of all kinds. We must, however, realize the amount of preliminary work necessary, for a man must have worked for years, as Mr. Kraemer has. Now work of this kind will enable pharmacists of the future to make use of and profit by this investigation, without groping in the dark as many workers now seem to be doing.

THE CHAIRMAN: I should like to call upon Prof. Remington to state what the Revision Committee are doing in the direction spoken of, if he can. I believe there is a subcommittee to take up the subject of powdered drugs during the next few years—are you familiar with the facts?

MR. REMINGTON: I do not understand the gentleman.

THE CHAIRMAN: Can you state to the Association the work of the sub-committee on powders—can you state to this Association that this work has been commenced?

MR. REMINGTON: I would say that such work is in contemplation, and I have no doubt it will be very thoroughly taken up, but no results have been handed in as yet.

DR. BARTLEY: I wish to call attention to the fact that attempts have been made to compare by the quantitative method, the fats in milk, and by the microscopical method also. I think Dr. Babcock, of the Experimental Station, has done a great deal of work in that direction and with some degree of success, although with nothing like accuracy; he found the size of the globules varied so that it was not possible to get exact results, and every physician is in the habit of applying for examination of human milk to chemists to a more or less extent, although that is a slightly different line, but it is in the line of quantitative examinations by the microscope.

MR. ELIEL: In connection with this paper, Mr. Kraemer desires me to say to any of the members who wish to pursue investigation in this line, that he would be very glad to furnish the micrometers necessary. In connection with the subject I would say I have always found my microscope to be my best friend in pursuing investigations in relation to powdered drugs.

THE CHAIRMAN: Are there any other remarks? If not, we will proceed to the reading of the papers sent here by the University of Michigan, and I will call upon Mr. Schlotterbeck to read a very brief abstract of the same.

The following is the text of the five papers:

EXPERIMENTAL WORK ON THE SOLVENT POWER OF ALCOHOLIC MENSTRUA.

BY L. D. HAVENHILL, PH. C., PH. M.

The Laboratory Notes on "The Variation of Menstrua in Fluid Extracts," by Prof. E. L. Patch (Proceedings American Pharmaceutical Association, 1893, Vol. xli, p. 84), afforded a suggestion that one might enter upon an interesting and beneficial line of experiments to determine the menstrua best adapted for obtaining the active principles of drugs, free from their inert extractives. Accordingly a series of experiments were made on ten of the more potent medicinal drugs, using menstrua of varying proportions of alcohol and water. Several methods of procedure were tried.

That of percolating the drug to exhaustion of its active principles and then estimating the per cent. of extractives and alkaloids in the percolate, was abandoned on account of the difficulty of determining exactly when exhaustion was complete, and also because in some cases it was impossible to completely exhaust it within reasonable limits of percolation.

The method of reserving the percolate in portions and determining the per cent. of alkaloid and extractive in each portion was soon discarded for the more feasible plan of making fluid extracts of the drug, as by this method not only the solvent action of menstrua could be demonstrated, but also the color and permanency of the fluid products could be noted.

Accordingly, one fluid extract was made from each drug, following out exactly the directions given in the Pharmacopœia. This fluid extract is given first in the subsequent tables and taken as a standard of comparison for color and keeping qualities.

Two and sometimes three other fluid extracts were made from the same sample of drug, varying the proportions of alcohol and water in the menstrua and making such changes in moistening and packing as were made necessary by changing from a strong alcoholic menstruum to a more aqueous one, or *vice versa*.

In making these fluid extracts the rate of percolation was controlled, bringing it in all cases as near to ten drops per minute as possible. The extractive was obtained by drying an aliquot portion of the fluid extract to constant weight at 100° C. in an air bath, and the per cent. given in terms of the drug (one C.c. being considered as one Gm.). The fluid extract in each instance was assayed for total alkaloids by the methods stated in the table and the per cent. given in the same terms as above. A comparison of the per cent. of alkaloids with the per cent. of extractive shows the relative purity of the active principles.

In most cases the drug itself was assayed by well-known methods, corresponding in manipulation as closely as possible to those used for the assay of the fluid extract.

By a comparison of these two assays an idea of the solvent power of the different menstrua is obtained, as regards their fitness for exhausting the drug of its medicinal principles.

From each of the fluid extracts two samples of about 35 C.c. each were reserved. One of these was put up without filtering to show the total amount of matter deposited, but before putting up the second sample the fluid extract was allowed to stand for from twenty-four to forty-eight hours and filtered, thus removing all the insoluble matter occasioned by the application of heat in concentrating the percolate. This sample from the filtered fluid extract will show the amount of deposit, if any, occasioned by age. (The samples bearing the per cent. of extractive were not filtered.) The appended tables show the results in concise form for reference, but they should be supplemented by the samples in order to appreciate the variation in the solvent action of varying proportions of alcohol and water.

No general relation was found to exist between the per cent. of extractive and the per cent. of alkaloids. The color and the extractive were in direct proportion; the darker the color, the greater the per cent. of extractive. Thus it is seen that the color of the fluid extract, contrary to the popular belief, is no criterion for the strength. It was very gratifying to note that the menstrua directed by the present Pharmacopœia were in nearly every instance the ones best fitted for extracting the active principles of the drugs on which experiments were made.

TABLE I.

Drug [1]	Menstruum pts. by vol.		C.c. of percolate.	10 Gm. of drug require Mayer's reagent N. 1-20.	10 C.c. of ext. require Mayer's reagent N. 1-20.	Per cent. of extractive.	Color of fluid extract.	Deposited after standing 48 hours.	Total deposit.	Remarks.
	Alc.	Water								
Gelsemium ...	Alc.	....	390	4.2	3.7	10.5	Amber.	Trace.	Trace.	
Gelsemium ...	3	1	390	4.2	4.2	15.8	Dark cherry red.	Considerable	Heavy.	Assayed by A. B. Lyons's method for Gelsemium by Mayer's reagent.
Gelsemium ...	1	1	390	4.2	4.0	16.1	Very dark cherry red.	Considerable	Very heavy.	
Veratrum.....	Alc.	....	490	....	3.8	12.7	Less dense cherry red.	None.	None.	Assayed by H. W. Snow's method.
Veratrum.....	3	1	490	....	4.6	20.1	Cherry red.	Trace.	Considerable	Crystals of cane sugar found in the alcoholic Fl. Ext. removed from one sample.
Veratrum.....	1	1	490	....	3.6	22.1	Cherry red.	Considerable	Quite heavy.	
Hyoscyamus .	2	1	390	2.6	2.3	28.0	Greenish red.	Traces.	Considerable.	
Hyoscyamus .	1	1	390	2.6	1.9	25.0	Greenish red.	Considerable	More than above.	Drug and Fl. Ext. assayed by A. B. Lyon's general method.
Hyoscyamus .	3	1	390	2.6	2.5	17.6	Greenish yellow.	Considerable	More than above.	Crystals of potassium nitrate found in the alcoholic Fl. Ext.
Hyoscyamus .	Alc.	....	390	2.6	2.2	8.1	Decidedly greenish.	None.	Same as above.	
Aconite	Alc.	....	390	....	....	11.8	Amber.	None.	None.	10 C.c. of Fl. Ext. in 1250 C.c. gave Squibb's Physiological Test.
Aconite	3	1	390	....	....	26.5	Dark cherry red.	None.	None.	10 C.c. Fl. Ext. in 1250 C.c. gave Squibb's Physiological Test, but not so strong as the above sample.
Aconite	1	1	390	....	....	29.4	Very dark red.	Trace.	Trace.	10 C.c. Fl. Ext. in 1000 C.c. gave Squibb's Physiolog. Test.

(1) 100 Gm. of drug used in each experiment.

(2) Volumetric assays.

TABLE II.

Drug [1]	Menstruum. pts. by vol.		C.c. of percolate.	Per cent. of alkaloid in drug by assay. [3]	Per cent. of alkaloid in fl. ext. by assay. [3]	Pereent. of extractive.	Color of fluid extract.	Deposited after standing 48 hours.	Total deposit.	Remarks.
	Alc.	Water								
Belladonna root........	4	1	340	0.26	0.27	17.2	....	....	....	Drug assayed by Dunstan and Ransom's method of hot percolation.
Belladonna root........	1	1	340	0.26	0.25	23.6	....	....	....	Fl. ext. assayed by A. B. Lyons's method of assay for fl. ext.
Belladonna root........	Alc.	....	500	0.26	0.25	5.9	....	....	....	
Stramonium seed........	3	1	590	....	....	23.0	Dark cherry red.	Trace.	Heavy.	Percolated to exhaustion of tropeines as indicated by Vitali's test for tropeines.
Stramonium seed........	1	1	1200	....	....	15.9	Dark cherry red.	None.	Heavy.	
Stramonium seed........	Alc.	....	500	....	....	24.6	Dark cherry red.	Trace.	Considerable.	
Podophyllum.	4	1	490	2.40	2.00	14.6	Cherry red, very transparent.	Trace.	Trace.	Drug assayed by A. B. Lyons's method for podophyllum for crude podophyllotoxin.
Podophyllum.	3	1	490	2.40	1.90	15.6	Cherry red, transparent.	Trace.	Trace.	Fl. ext. assayed by mixing it with oak sawdust, and evaporating to dryness (F.A. Thompson), and then proceeding as with the crude drug.
Podophyllum.	1	1	490	2.40	1.35	19.5c	Cherry red, very dense.	Considerable.	Considerable.	
Podophyllum.	Alc.	....	490	2.40	2.25	7.6	Very light.	None.	Trace.	
Pilocarpus....	1	1	385	1 02	1.00	25.7	Brownish red.	Considerable.	Quite Heavy.	Drug assayed by A.B.Lyons's general method of assay.
Pilocarpus....	3	1	385	1.02	.80	21.7	Greenish red.	Trace.	Considerable.	Fl. ext. mixed with sawdust and evaporated to dryness (F. A. Thompson), and proceeding then as for crude drug.
Pilocarpus....	Alc.	....	385	1.02	.55	12.5	Greenish.	Considerable.	Quite Heavy.	
Nux Vomica..	3	1[2]	700	3.13	2.87	14.9	Red.	None.	Considerable.	Drug assayed by U. S. P. method excepting that instead of titrating the acid solution it was made alkaline and shaken out with chloroform and the estimation made gravimetrically instead of volumetrically.
Nux Vomica..	3	1	700	3.13	2.26	14.7	Dark cherry red.	Trace.	Considerable.	
Nux Vomica..	9.8	1	700	3.13	2.42	12.5	Dark cherry red.	Trace.	Considerable.	
Nux Vomica..	9.8	1	700	3.13	2.37	12.1	Red.	None.	Considerable.	

(1) 100 Gm. of drug used in each experiment. (2) 5 C.c. of acetic acid used. (3) Gravimetric assays.

TABLE III.

Cinchona.*	Per cent. of alkaloids in each 50 C.c. of percolate.								Per cent. of total alkaloids extracted.†	Per cent. of total alkaloids in drug by assay.‡	Remarks.
Menstruum pts. by vol.	1	2	3	4	5	6	7	8			
Alc. 80 C.c. Glyc. 20 C.c. Alc. 4, Water 1 } Q. S.	1.917	1.103	0.843	0.530	0.283	0.177	0.096	0.056	5.105	5.25	Dark reddish brown color.
Alc. 4, Water 1 } Q. S.	1.773	1.213	0.713	0.590	0.280	0.180	0.086	0.053	4.89	5.25	About the same color as No. 1.
Alc. 90 C.c. Glyc. 10 C.c. Alc. 9, Water 1 } Q. S.	1.883	0.947	0.577	0.417	0.330	0.210	0.163	0.13	4.657	5.26	About the same color as No. 1.
Alc. 60 C.c. Glyc. 20 C.c. Water 20 C.c. Alc. 3, Water 2 } Q. S.	1.140	0.687	0.427	0.313	0.353	0.413	0.327	0.197	3.857	5.25	The irregularity in these results was due to unequal rate of percolation. About the same color as No. 1, possibly a little lighter.
Alc. 1, Water 1 } Q. S.	1.053	0.567	0.427	0.350	0.213	0.113	0.063	0.043	2.829	5.25	Rather lighter colored than No. 1.

* 100 Gm. of drug used in each experiment. † A. B. Lyons's general method for Fl. Ext. ‡ Assayed by U. S. P. method.

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REDUCED IRON.

(*The quality dispensed by Pharmacists.*)

BY G. C. STEVENTON, PH. C.

The question is, to determine the per cent. of metallic iron, in the free and uncombined state, the per cent. of insoluble residue, together with the presence or absence of certain impurities within specified limits.

MODE OF COLLECTION.

The samples for the analysis were all purchased at retail stores in Youngstown, Ohio, and Ann Arbor, Mich.; no intimation being given to the pharmacist for what purpose the iron was intended. The samples were placed in dry ground-glass-stoppered bottles, furnished at the time of the purchase. These samples may be said to fairly represent the condition of the preparation as found upon the market.

MODES OF EXAMINATION.

Per cent. of Total Iron.—The per cent. of total iron was estimated by the common permanganate method: 0.1 Gm. of the sample was digested upon a water-bath with hydrochloric acid to complete solution; 10 C.c. of sulphuric acid are now added, and the hydrochloric acid evaporated off at a low temperature. The whole is now rinsed into an Erlenmeyer flask, diluted to 100–150 C.c. and 2 Gm. of pure zinc added. The flask is set aside for an hour in a warm place, after which time the contents are filtered through a glass plug, and immediately titrated with permanganate.

Per cent. of Free Iron.—This per cent. was determined by the method recommended by the Pharmacopœia, in which a weighed quantity of iron is digested with mercuric chloride in a well-stoppered flask; diluting to a definite volume, filtering, taking an aliquot portion, acidulating with sulphuric acid, and titrating with permanganate.

$$2HgCl_2+Fe=FeCl_2+Hg_2Cl_2.$$
$$HgCl_2+Fe=FeCl_2+Hg.$$
$$FeCl_2+H_2SO_4=FeSO_4+2HCl.$$
$$10FeSO_4+2KMnO_4+8H_2SO_4=5Fe_2(SO_4)_3+K_2SO_4+2MnSO_4+8H_2O.$$

The equations show the successive chemical reactions. The operation first effects the conversion of the free iron to ferrous chloride, while the oxides remain unaffected. With relative proportions of iron and mercuric chloride, the latter becomes reduced either to mercurous chloride or free mercury. The sulphuric acid displaces the hydrochloric acid, and the resulting ferrous sulphate is oxidized to ferric sulphate by the permanganate.

Arsenic.—Bettendorff's test, or that recognized by the Pharmacopœia, was used (Limit 1 : 10,000).

—Silver Nitrate Test.—About 0.5 Gm. of iron were placed in a large test tube, a convenient quantity of hydrochloric acid added; immediately a cotton plug, saturated with lead acetate, was inserted in the mouth of the tube, and the top covered with a filter paper containing silver nitrate solution. The effervescing liquid was left for half an hour, when the black color of the filter paper indicated the presence of arsenic. The whole of this experiment was performed in a dark room, so as to prevent any reducing action of light upon the silver salt (Limit 1 : 1,000,000).

Sulphur.—The blackening of the cotton plugs, saturated with lead acetate, gave the evidence of the presence of a sulphide or sulphur.

Copper.—The hydrochloric solution of 0.5 Gm. of iron was precipitated with an excess of ammonium hydroxide, filtered, and the filtrate concentrated. One drop of this filtrate and two drops of hydrobromic acid were evaporated together to one-half the volume, when the appearance of a rose-red color indicated the presence of copper (Limit 0.00001 Gm.).

Insoluble Residue.—The residue on digesting with warm dilute sulphuric acid, was transferred to counterpoised filters, washed well, dried and weighed.

The reaction of an aqueous mixture was determined by a weak solution of litmus.

The question which most interests the pharmacist is the per cent. of the free uncombined iron. Of the ten samples analyzed, only three were equal or above the standard (80 per cent.) required by the Pharmacopœia. The remainder of the samples were from 16 to 60 per cent. below the standard, while two contained from 2 to 5 per cent. less of total iron than that required of the free uncombined iron. That which contained the highest per cent. both of total and uncombined iron was a fine grey powder without lustre; those of lower per cent. gradually degraded to a very black powder. From these analyses, it appears that the preparation is of a very inferior quality, and presents an item which should not be treated lightly by pharmacists. The U. S. Pharmacopœia allows a good margin for impurities, a margin greater than that allowed by some other pharmacopœias; the Ph. G. requires of this article at least 90 per cent. of free uncombined iron. The per cent. of insoluble residue presents another important feature. Only two samples were found to be below the limit (0.1 per cent.) allowed; the remainder contained from four to twenty times the maximum of per cent. No copper was found to be present and there was but a slight trace of sulphur as indicated in the table.

Arsenic was found in every case, by both tests. The hydrochloric solution of 0.5 Gm. of the iron, tested with potassium sulphocyanide, gave colorations from a slight red to a deep blood red, as indicated in the table (evidence of ferric iron), while the aqueous mixture was slightly acid in every case.

SUMMARY OF ANALYSES.

No.	Per cent. of total Iron.	Per cent. of uncombined Iron.	Per cent. of Insoluble Residue.	Color. All samples were non-lustrous.	Presence of sulphur.	Hydrochloric solution tested with KCNS.	Silver nitrate test for Arsenic.*
1.	97.986	94.799	0.817	Fine grey.	Slight trace.	Slight red.	++
2.	87.775	48.411	0.857	Light slate.	....	Faint red.	++
3.	83.051	43.464	0.917	Dull dark slate.	Slight trace.	Slight red.	+++
4.	83.219	33.326	2.055	Black.	Trace.	Deep red.	+++
5.	96.554	91.892	0.039	Dark grey.	....	Slight red.	++
6.	86.213	58.925	0.099	Dark slate,	Slight trace.	Slight red.	++
7.	74.511	20.072	0.657	Black.	Slight trace.	Very deep red.	+
8.	84.744	64.537	0.498	Dark slate.	Slight trace.	Deep red.	+++
9.	97.512	92.059	0.674	Dull grey.	....	Slight red.	+++
10.	78.182	43.469	1.083	Dull black.	....	Deep red.	+

* + signifies a dark brown; ++, a black; +++, a heavy black color, at the expiration of half an hour.

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WHITE CASTILE SOAP.

BY SAMUEL R. KNOX, PH. C.

The purity of white castile soap having been questioned, has led to the following investigation. Before entering upon the methods of analysis and the tests for impurities, it is well to refer to the material of which soap is composed.

In the common acceptation of the word, soap is the product of the action of caustic alkalies upon fats. The formation of a soap from a fat and an alkali, involves the principle of saponification by which the glycerides of the fatty acids are decomposed, and salts of these acids formed—the salts of alkali metals being soap proper. The greater the quantity of fat acids combined in a soap, the higher is its value. A good sample of castile soap, besides neutral salts, should only contain free water, the quantity of which gives a means of estimating the value of the soap, sixteen to twenty per cent. being a sufficient amount. When too small a quantity of water is used the soap becomes hard, and labor is lost in obtaining a lather. If, on the other hand, water is held in too large a quantity, there is a great loss of material.

In analysis, the amount of water was first estimated. Ten Gm. of the sample from the centre of the cake was reduced to fine shavings and dried at 100° to 110° C. for twelve to twenty-four hours. The shavings were then reduced to fine powder and dried to a constant weight, care being taken not to burn the soap.

The next step was to estimate the unsaponified matter. In the manufacture of soap it is difficult to form a complete saponification. This unsaponified matter was estimated by extracting the samples in a Soxhlet's continuous extraction apparatus with petroleum ether, evaporating the solution and drying the residue at 100° C.

That part not volatile at 110° C., and insoluble in petroleum ether, really constitutes the soap proper. It still remains to estimate the relative proportion of fatty acids and alkali. To do this the petroleum ether was allowed to evaporate, the soap dissolved in hot water. The aqueous solution was then decomposed by adding normal sulphuric acid to slight excess to insure complete decomposition of the soap. The decomposition was made with the solution heated nearly to boiling. By having the solution hot the fatty acids separated in form of an oil more readily and held less water in contact.

Three methods of manipulation for the separation of the oil from the aqueous solution were used. In the first, the oil was separated by filtering the solution while still hot through an ordinary filter paper, previously wet with water. In the second method, after separating the oil, the solution was allowed to cool before filtering. This method was not so satisfactory as the first, as the oil upon cooling in the aqueous solution often became a solid or semi-solid, and held water in suspension, which had to be evaporated before weighing. In the third, and most satisfactory method of all, a known weight of pure beeswax was added to the hot solution. The fats thus became amalgamated with the melted wax, and upon cooling, a firm coherent cake was formed, which was easily dried and weighed. (See Allen's Commercial Organic Analysis.)

The latter method is superior both as to convenience and results. In this way the fatty acids are more readily handled and there is less of the aqueous solution lost, thus insuring more accurate estimation of alkali.

The next step was to finish the estimation of the alkali. As stated above, the normal sulphuric acid was added to an excess. In order to find the total amount of alkali in the soap it remains to titrate the excess of the sulphuric acid with a standard solution of alkali. Methyl orange as an indicator was used and the excess of acid titrated back with normal potassium hydroxide. The difference between the sulphuric acid thus found and that previously added gives the equivalent of acid required to neutralize the total alkali present in the soap.

Castile soap is made from olive oil and caustic soda. Olive oil is, however, often adulterated with linseed, poppy seed, cotton seed and other cheap and low grade oils. The following test of the United States Pharmacopœia was used to detect these impurities in the "oil" of the soap, one-third of the amount specified being used. Six Gm. of the fatty acids from the soap was thoroughly shaken for two minutes with a mixture of 1.5 Gm. of nitric acid and 5 Gm. of water, then heated in a bath of boiling water for not more than fifteen minutes. The oil should retain a light yellow color, not becoming orange or reddish brown, and after standing at the ordinary temperature for twelve hours it should form a perfectly solid light yellowish mass.

Another test given in Dr. Prescott's Organic Analysis, page 285, was also used. One part of oil is agitated with two parts of a cold mixture of equal parts of sulphuric and nitric acids, set aside for half an hour. The oil should not assume a darker color than yellowish.

The following table shows the result of analysis. It is seen from it that white castile soap on the market is highly adulterated with other oils, only one sample out of the eight conforming in purity to the tests above described. The table also shows the per cent. of water, which is the most variable quantity, the per cent. of unsaponified matter, of total alkali and of fatty acids. The results in the last column were obtained by calculating the per cent. of combined fatty acids. It shows, with one exception, but slight variation in the per cent. of combined fatty acids. From this investigation it will be seen that although the olive oil used in making white castile soap in most cases is highly adulterated with cheap and low grade oils, yet it shows a high per cent. of combined fatty acids, which is necessary in the composition of a good article of soap.

	Per cent. Water.	Unsaponified.	Alkali.	Oil.	Quality of Fatty Acids or Oils.	Oil in Dry Sample.
1	20.78	.105	8.86	69.59	Good.	87.8
2	8.36	.86	8.92	77.41	Moderately pure.	84.4
3	3.12	.85	9.02	81.29	Heavy adulteration.	83.9
4	13.48	.23	8.18	74.76	Heavy adulteration.	86.4
5	12.40	.45	8.80	74.57	Slightly adulterated.	85.1
6	7.05	.62	9.48	82.48	Heavy adulteration.	88.7
7	13.11	.10	9.30	62.64	Heavy adulteration.	72.0
8	18.41	.74	7.90	71.85	Heavy adulteration.	88.1

References.—A. B. Prescott: Organic Analysis. Alder Wright: Fats, Oils and Waxes. Wagner: Manual Technology, pp. 911–921. U. S. Pharmacopœia. Allen: Commercial Organic Analysis, vol. II.

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EXAMINATION OF KOLA.

BY C. O. TOPPING, PH. C.

In these experiments with kola, the dry cotyledons were powdered, passed through a number 60 sieve and dried at 100° C. in a drying oven before weighing.

Six samples were examined, and the amount of total alkaloids—caffeine and theobromine, and tannin—estimated.

The one first examined was a carefully selected sample of the two-cotyledoned variety. The cotyledons were uniform in shape and size, of a light chestnut brown color, and yielded a light brown powder. In assaying this sample for alkaloids, three methods were tried. The first was that of Heckel and Schlagdenhauffen (Amer. Journ. Phar., 1884, p. 169). Ten Gm. of the sample were percolated in a Soxhlet's extraction apparatus for ten hours with 60 C.c. of chloroform. At the close of the operation a drop of the chloroform was tested for caffeine by the "murexid test," (Prescott's Organic Analysis, p. 79,) with negative results. The chloroformic solution, which was light straw-colored, was filtered to free it from particles of the powder which had been carried through the flask, and filter washed with a little chloroform, and the united filtrates evaporated to dryness over the water bath. The residue consisted of a resinous mass, light yellow in color, and having a peculiar odor somewhat resembling that of cacao butter. The residue was digested on the water bath with 25 C.c. of 1 per cent. sulphuric acid for fifteen minutes, then filtered into a separatory funnel, and the flask and filter washed twice with 10 C.c. of water. After making alkaline with strong ammonia water, the solution was shaken out three times with chloroform, once with 25 C.c. and twice with 10 C.c., and the united chloroform solutions evaporated at about 80° C. The resulting alkaloids, which were pure white and in needle-like crystals, were dried finally at 100° C. and weighed, giving 1.415 per cent. of total alkaloids.

The mixture of alkaloids was next treated with cold benzol, to separate the caffeine from the theobromine. Caffeine is soluble in cold benzol, while theobromine is practically insoluble. (Prescott's Organ. Anal. pp. 76, 513.)

To the mixture of alkaloids 20 C.c. of benzol were added and the whole occasionally agitated during two hours. A fine white precipitate of theobromine remained in the bottom of the beaker. The solution was next filtered through counterpoised filters, the beaker and filter washed with 10 C.c. of benzol, and the solution evaporated to dryness with gentle heat. The residue was finally dried at 100° C. and weighed as caffeine, giving 97.5 per cent. of the total alkaloids, or 1.379 per cent. of the sample taken.

The filters were then dried and weighed, and the increase in weight taken as theobromine. This gave 2.5 per cent. of the total alkaloids, or 0.035 per cent. of the sample. A duplicate worked parallel with the above gave total alkaloids 1.42 per cent., caffeine, 1.382 per cent., theobromine, 0.0356 per cent.

The second method tried was Dr. Squibb's method for caffeine. (Prescott's Organic Analysis, p. 81). Ten grams of the sample were triturated with 2 Gm. of calcined magnesia to a uniform mixture and boiled with 100 C.c. of water for five minutes, stirring constantly. Fifty C.c. of alcohol were added to the boiling mixture and the whole poured upon a filter, allowed to drain, then percolated with 100 C.c. of a mixture of 40 volumes of alcohol and 60 volumes of water. The residue was again boiled with 100 C.c. of the mixture of alcohol and water for five minutes, filtered through the same filter, and washed until the entire filtrate amounted to about 350 C.c. This was concentrated to about 25 C.c., filtered and exhausted with chloroform. Total alkaloids, 1.45 per cent.; caffeine, 1.41 per cent.; theobromine, 0.036 per cent. The duplicate gave total alkaloids, 1.48 per cent.; caffeine, 1.44 per cent.; theobromine, 0.037 per cent.

In the third method "modified Prollius fluid" was substituted for chloroform in the first method. The solvent mixture consists of ether, 350 C.c.; chloroform, 90 C.c.; alcohol, 25 C.c., and stronger ammonia water, 10 C.c. Sixty C.c. of the solvent mixture were used for 10 Gm. of the sample and the extraction continued during twelve hours; otherwise the manipulations were the same as in the first method. The result was an average of 1.40 per cent. total alkaloids; caffeine, 1.36 per cent.; theobromine, 0.035 per cent.

In the researches of Dr. Knebel (Apotheker Zeitung, March, 1892, p. 112,) and also those of Dr. Heckel (see Kolas Africains), it was observed that kola possessed certain medicinal properties distinguishing it from all other caffeine bearing drugs. They have each attributed this peculiarity to the presence of a glucoside called kolanin, which, through the combined action of dilute acid and a ferment present in the drug, is capable of decomposition yielding caffeine as one of its products. The presence of the ferment was inferred from the fact that after being plunged into boiling water, the glucoside could not be decomposed with the production of caffeine.

Upon these observations the following experiment was based.

The powder, which had been freed from alkaloids by percolating with chloroform, was dried and macerated over night with 100 C.c. of 4 per cent. hydrochlororic acid. The mixture was then filtered, the filtrate concentrated to 40 C.c. and shaken out with 25 C.c. of chloroform. The chloroform solution when evaporated yielded 0.19 per cent. of alkaloids.

The residue from the filter was again macerated with 100 C.c. of 4 per cent. acid for twenty-four hours, and treated as before. The chloroform solution still gave tests for caffeine. The residue was then macerated as before for forty-eight hours, and gave traces of caffeine. After further maceration no indication of caffeine was obtained.

Another sample of the exhausted powder was then plunged into 150 C.c. of boiling water, boiled for three or four minutes, acidulated with hydrochloric acid and allowed to stand for twenty-four hours, filtered, the filtrate concentrated and exhausted with chloroform. The chloroform solution gave negative tests for caffeine.

This experiment indicates that caffeine was developed in the powder, by the action of the dilute acid in the cold; and that after treatment with boiling water no caffeine was developed.

For the estimation of tannin Lowenthal's method was employed (Bulletin No. 13, U. S. Department of Agriculture, Chemical Division, p. 9).

The following solutions were required:

(*a*) Decinormal solution of potassium permanganate, standardized with iron wire.

(*b*) Indigo carmine solution, containing six grams of indigo carmine and 50 C.c. of sulphuric acid per litre.

(*c*) Gelatine solution, prepared by swelling 25 Gm. of gelatine for one hour in a saturated solution of common salt, then heating to complete solution, cooling and making up to one litre with the saturated solution of salt.

(*d*) Salt acid solution, prepared by mixing 25 C.c. of strong sulphuric acid with 975 C.c. of saturated solution of common salt.

Five Gm. of the sample were placed in a half litre flask and boiled with 300 C.c. of water for half an hour. The flask was then cooled and the contents made up to 500 C.c. with water. The aliquot portions to be estimated were then filtered off.

To 10 C.c. of the solution, 25 C.c. of indicator were added and about 700 C.c. of water. Potassium permanganate solution was then run in from a burette, 1 C.c. at a time (shaking thoroughly after each addition), until the color changed to a light green, then continued drop by drop, until the solution took on a bright yellow color. The reading was then taken. The result represents the number of C.c. of potassium permanganate solution required to oxidize all oxidizable matter present.

Now to 100 C.c. of the solution under analysis were added 50 C.c. of gelatine solution, 100 C.c. of salt acid solution, and 10 Gm. of powdered kaolin, the flask closed and agitated for five minutes. The precipitated gelatine and tannin, by the aid of the kaolin, settle rapidly, leaving a clear solution which filters readily.

Twenty-five C.c. of this filtrate, representing 10 C.c. of the original solution, were then titrated with permanganate, under exactly the same conditions as were present in the first titration, the result giving the amount of permanganate solution necessary to oxidize all substances present other than tannin. Subtracting this last result from the former one, we have the number of C.c. of permanganate solution necessary to oxidize the tannin.

"From experiments upon tannin solution of known strength Neubauer determined that 1 C.c. of decinormal potassium permanganate will oxidize 0.004157 Gm. of tannin." (Prescott's Organ. Anal., p. 470.) From the above calculations the amount of tannin present in this sample was found to be 1.226 per cent.

The next sample examined was stated by the jobbers to be "False kola, from Garcinia kola." It is also known as male and bitter kola. It was a mixture of both two and five cotyledoned varieties, nearly black in color, and had been carelessly dried, some of the cotyledons being mouldy. In the analyses of Heckel and Schlagdenhauffen, above referred to, no caffeine was found in false kola.

As a preliminary test of the sample in hand, 5 Gm. of the powder were treated with chloroform in an extraction apparatus for six hours, the chloroform solution evaporated, the residue exhausted with water and this in turn with chloroform, when the chloroform solution gave all the tests for caffeine.

A quantitative estimation was then made, as described in method 1, which gave 0.02 per cent of alkaloids.

Believing that a few pieces of true kola might have been accidentally mixed with the original sample and thus contaminated it, a few of the nuts, most resembling the description of false kola, were powdered separately and tested; but they gave positive tests for caffeine. The conclusion drawn was that the sample examined was not false kola, but a very poor sample of the true. The same sample contained 3.27 per cent. of tannin.

The third sample was from a five cotyledoned variety. It was a fair sample, darker in color and yielded a darker powder than the first. It was assayed for alkaloids by methods 1 and 2, which gave respectively 1.23 per cent. and 1.24 per cent. total alkaloids. Yield of tannin 3.27 per cent.

The exhausted residues by method 1 were treated for the presence of a glucoside and ferment in a manner parallel to that described under the first sample, with substantially the same results.

Sample 4, also from a five cotyledoned variety, was an inferior sample, nearly black in color, carelessly selected and uneven in size. Assayed by method 1 it gave total alkaloids 0.845 per cent., tannin 4.07 per cent.

Sample 5, a two cotyledoned variety, was carefully selected, uniform in size, and light colored. It yielded total alkaloids 1.125 per cent., tannin 0.807 per cent.

Sample 6 was a five cotyledoned variety. It was carefully selected, the cotyledons small and light brown in color. It yielded 1.381 per cent. total alkaloids, and 3.27 per cent. of tannin.

The following is a tabulated statement of the estimations made, giving methods and results. The number of the methods refers to them as described under the first sample :

	Method.	Total Alk.	Caffeine.	Theobromine.	Tannin.
Sample 1. Two cotyledons.	1	1.415	1.379	0.035	
	Duplicate.	1.420	1.382	0.0356	
	2	1.450	1.410	0.036	
	Duplicate.	1.480	1.440	0.037	
	3	1.400	1.360	0.035	
	Duplicate.	1.370	1.330	0.034	
	Average.	1.424	1.384	0.0354	1.226
Sample 2. Both two and five cotyledons.	1	0.020			
	Duplicate.	0.023			
	Average.	0.0215	....	....	3.27
Sample 3. Five cotyledons.	1	1.230	1.199	0.0307	
	Duplicate.	1.245	1.214	0.0311	
	2	1.230	1.199	0.0307	
	Duplicate.	1.250	1.218	0.0312	
	Average.	1.240	1.208	0.0309	3.26
Sample 4. Five cotyledons.	1	0.845	0.8248	0.0211	
	Duplicate.	0.837	0.8161	0.0208	
	Average.	0.841	0.8205	0.0209	4.07
Sample 5. Two cotyledons.	1	1.125	1.0968	0.0281	
	Duplicate.	1.121	1.0930	0.0280	
	Average.	1.123	1.0949	0.02805	0.817
Sample 6. Five cotyledons.	1	1.381	1.3464	0.0345	
	Duplicate.	1.390	1.3552	0.0347	
	Average.	1.385	1.3508	0.0346	3.27

School of Pharmacy, University of Michigan.

GLYCERIN OF THE MARKET.

BY J. L. TEGARDEN, PH. C.

In order that the sources of impurities and adulterations that are liable to be present in glycerin may be understood, a brief review of the process of manufacture is necessary.

Commercially, glycerin is invariably obtained as the result of the decomposition of neutral fatty bodies in the process of manufacture of either candles or soap. Long experience has shown that fatty oils from all sources yield not isomers and homologues of glycerin, but exactly the same variety of glycerol. Various agents have been employed in the saponification of fats. In former times olive oil was boiled with oxide of lead and water, later the litharge was replaced by lime; succeeding these processes saponification was effected by water and high pressure, by sulphuric acid, by superheated steam and subsequent distillation.

At present by far the greatest amount of commercial glycerin is either a by-product of the soap manufactory, or is made by saponification of fats with some base, under high pressure. The "sweet water," as it is called, which is formed, is separated at this point by pressure or distillation and then concentrated or distilled. In leading manufactories of England and America zinc oxide is now used to replace one-half of the lime. It is claimed that the reducing action of the zinc prevents the discoloration of the fatty acids, such as results from other treatment. It will be seen then that impurities do not naturally exist in glycerin, but are introduced by the reagents used in its manufacture. Neither the color nor the specific gravity of a sample are safe indications as to whether it consists of crude or distilled glycerin. As a rule the latter is light in color, but often is brown and even black, and its specific gravity rarely exceeds 1.261; whereas the former is usually dark, varying in color from yellow to black, and ranging in specific gravity from 1.25 and even less, to as high as 1.36, according to the degree of concentration. One of my samples which subsequently proved to be a chemically pure article gave a specific gravity of 1.263, while the one containing the most impurities gave a gravity of 1.259. A good indication as to the quality of glycerin can be obtained by subjecting it to ignition, as the amount of mineral residue in distilled glycerin is never more than 0.2 per cent., whereas all crude samples contain much more—soap lye glycerin containing as high as 9 to 14 per cent.

The United States Pharmacopœia ignition test is to place a small portion of glycerin in an open evaporating dish, then heat gently till it ignites. It should burn and vaporize and not leave more than a dark stain. This establishes the fact of the absence of dextrin and sugar. And then, on full combustion no residue whatever should be left; this indicates the absence of fixed impurities. Out of the thirteen samples tested all were free from sugars and fixed impurities, except numbers eight and ten. Number eight contained a sufficient amount of ash to be considered a crude sample. Sullman and Berry, who are acknowledged by A. H. Allen to be authority on this subject, say that a preliminary distinction between a crude and a distilled product is indicated by the former causing a great deal of spluttering during volatilization, while the latter volatilizes quietly. In this respect, also, the above suspected sample indicated a very poor quality of a raw or crude glycerin. By a more thorough analysis this sample was found to contain as intentional impurities magnesium sulphate and glucose, these being used extensively in some manufactories for the purpose of adulteration.

Fehling's method is recommended as the best test for the detection of sugars. It is impossible for this substance to occur in glycerin unless employed as an adulterant, and consequently it is only necessary to look for it in a distilled product. The Pharmacopœia directs that 5 C.c. of glycerin be mixed with 50 C c. of water and 10 drops of hydrochloric acid in a small flask and heated for thirty minutes on a water-bath, and then mix 10 C.c. of this liquid with 2 C.c. of sodium hydrate T. S. and 1 C.c. of alkaline cupric tartrate V. S. No yellowish red cloudiness or precipitate should appear within six hours. Some of the samples analyzed by this method were found to contain sugar.

To detect the presence of formic and butyric acids, gradually heat 5 C.c. of glycerin with 3 C.c. of dilute sulphuric acid below the boiling point. There should be no offensive or acidulous odor evolved. Six of the samples gave reactions for the above-named acids.

As has been stated, the variety of impurities that are found in commercial glycerin are such as are contained in the reagents used in the manufacture of it. Sulphates and sulphur compounds, chlorides, lead, iron, zinc, calcium, magnesium, arsenic and other metals, oxalic acid, resinous matters and fatty acids are the impurities that are likely to be detected in glycerin. Sulphates always occur where sulphuric acid has been used as the saponifying agent of the fat. Salts of sulphites, sulphides and thiosulphates are also formed. Calcium is usually met with in the form of an oleate. Oxalic acid sometimes occurs in glycerin, being used either as a reagent or an oxidation product. Three of the samples contained sulphates, five contained calcium salts, none contained oxalic acid, and all were more or less contaminated with chloride in the form of either a sodium or a calcium salt. The Pharmacopœia says: "No color, cloudiness or precipitate should appear when separate portions of its aqueous solution (1 in 10) are treated with hydrogen sulphide or ammonium sulphide T. S. (absence of metals), barium chloride T. S. (absence of sulphuric acid), calcium chloride T. S. (absence of oxalic acid), or ammonium oxalate T. S. (absence of calcium salts). The test for chlorides is based upon the readiness with which silver chloride is formed when glycerin containing a chloride is brought in contact with silver nitrate in diffused daylight. Acrolein is an irritating aldehyde which should not naturally be developed in a good sample of glycerin. Prof. Coblentz, of the College of Pharmacy of the City of New York, says that if there be the least trace of acrolein in glycerin, it can always be detected by adding 1 C.c. of fuchsin (decolorized by SO_2), and, if present, the mixture will assume a purple color. By this method a trace of acrolein was found in each of the samples I analyzed.

For the past few years it has been repeatedly stated that some samples of glycerin intended for pharmaceutical and medicinal purposes contained a sufficient quantity of arsenic to cause suspicion and alarm. That this fact was known to the manufacturer there is no doubt, but it is also true that he took great care not to enlighten the consumer on this most vital and important point. The arsenic in glycerin, like most other accidental impurities named in this article, has its origin in the reagents used in the manufacture. It has been stated by good authority that distilled glycerin would not be contaminated with arsenic. A. H. Allen, in discussing the subject in the British Pharmaceutical Conference at Leeds, in 1892, seemed to entertain some doubts about it, yet, in his concluding remarks, he distinctly states that it can be removed by distillation. Mr. Lewkowitsch, in a recent article on "Glycerin," takes a different view of the subject. He says that arsenic exists in glycerin in the form of an arsenous ether of glycerin, as $O_3(C_3H_5)$. From experiments conducted by him, he finds that arsenic in this form distils over at 250° C., the same temperature at which glycerin is distilled. If this be true, there is no practical process by which glycerin once contaminated with arsenic can be completely freed from it. Therefore, chemically pure glycerin, free from arsenic, is produced only when reagents not containing it are employed.

With a view to ascertain what proportion of commercial glycerin was free from this poisonous drug, I examined all the samples I had, which were mostly of different manufacture. Seven of the samples contained comparatively large amounts. Two samples contained minute traces, which might be disregarded, while four were absolutely free from it. The method used for detecting arsenic was that introduced by Gutzeit, and is now recognized by the Pharmacopœia. It consists in allowing the gas, slowly eliminated by the action of sulphuric acid on zinc in presence of the liquid supposed to contain arsenic, to come in contact with three thicknesses of filter paper, moistened with a saturated acid solution of silver nitrate. In order that sulphides which might be formed may not reach the filter paper, a plug of cotton or glass wool, moistened with lead acetate solution, is introduced into the mouth of the test tube. The presence of arsenic is shown by the production upon the paper cap of a bright yellow stain, which turns dark by the application of water. Vulpius, Fluckiger and Siebold employ a modification of this test. Vulpius and Fluckiger substitute hydrochloric acid for sulphuric acid, and do not use the moistened plug of cotton. Siebold modifies the method just described by using a solution of mercuric chloride instead of silver nitrate. In the latter test a yellow spot will be the result of minute traces of arsenic.

It is said that the Marsh test is inapplicable to glycerin. It would have been interesting to verify the statement, but time has not permitted me to do it.

To recapitulate, glycerin intended for medicinal purposes should be distilled once or twice. It should have a specific gravity of at least 1.25, and should be free from all metallic and organic impurities and adulterations.

References.—Analyst, Vol. 11, pp. 12, 34. Analyst, Vol. 11, p. 52. Chemical News, Vol. 67, 1893, p. 46. U. S. Pharmacopœia, 1890, p. 466. Journal Society Chemical Industry, Vol. 8, pp. 639–640. Journal Society Chemical Industry, Vol. 8, p. 726.

Other references are: Journal American Chem. So., Vol. 11, p. 12. Manual of Chemical Technology, Wagner. Microchemistry of Poisons, Wormley.

TABLE ILLUSTRATING THE WORK DONE ON GLYCERIN.

No.	Sp. gr.	Dex. and Sug.	Fix. Imp.	Sugars.	Carb. Imp.	Fatty Acids.	H_2SO_4.	Oxalic Acid.	Calcium Salts.	Chlorides.	Arsenic.
1	1.256	....	....	....	Good.	....	....	......	....	Small amounts.	Large amounts.
2	1.255	....	....	....	Very good.	....	....	......	....	Small amounts.	Trace.
3	1.261	....	....	....	Good.	....	....	......	....	Small amounts.	
4	1.258	....	....	....	Very good.	....	....	......	....	Small amounts.	Large amounts.
5	1.254	....	....	Sugars.	Good.	....	Sulph.	......	Found.	Small amounts.	
6	1.25	....	....	Sugar.	Fair.	....	....	......	Found.	Small amounts.	
7	1.250	....	....	Sl. am't sug.	Fair?	Sl. odor.	Sulph.	......	....	Small amounts.	Trace.
8	1.259	Gt. amounts. Sug. and dex. Spluttering.	Fix. imp.	....	Fair.	Sl. odor.	Large am'ts. Sulphates.	......	Found.	Great amounts.	Trace.
9	1.258	....	....	....	Good.	Sl. odor.	....	......	Very little.	V. small amounts.	Trace.
10	1.255	Small am'ts. Dex. and sug.	Fix. imp.	....	Good.	....	....	......	Considerable amounts.	V. small amounts.	Trace.
11	1.263	....	....	....	V. v. good.	V. sl. odor.	....	......	....	V. small amounts.	
12	1.260	....	....	....	V. v. good.	V. sl. odor.	....	......	....	V. small amounts.	Trace.
13	1.26	....	....	....	Very good.	V. sl. odor.	....	......	....	V. v. small am'ts.	

School of Pharmacy, University of Michigan.

MR. ALPERS: I believe that these papers are open now for discussion.

THE CHAIRMAN: The papers have been read in abstract and the writers have been heard, and remarks on the papers are now in order.

MR. ALPERS: I believe I am in the same position most of us labor under, that of a confusion of names, titles and abstracts. It seem to me not a proper way to present a number of papers in bulk under a general heading as here—The University of Michigan. I do not know that it has ever been done before. Why these different authors do not present their papers separately to be received, criticised and talked over, and taken on their own merits, I do not know, unless it is done for the purpose of advertising the University of Michigan.

THE CHAIRMAN: I will answer that question. I am entirely responsible for that. Of course, the members of this Association know very well that I am here in this position to do the duties of the office of Chairman, and not to advertise anybody, and if any advertising has been done it is an oversight. I am merely doing what has been done heretofore. Prof. Prescott has been here at various times, and other members of the Faculty of the Ann Arbor School, and they have presented papers as contributions from the University of Michigan. I hope that any allusion of this kind will be hereafter omitted. It is not fair, it seems to me, to make such allusions as this and it is not supposed that Ann Arbor comes here to advertise the Ann Arbor School, any more than the University of Kansas comes here to advertise the University of Kansas. I think that these remarks are wholly uncalled for, and entirely out of place. I will ask for the report of the committee which has been appointed to receive or recommend to the Association action upon the paper contributed by J. B. Nagelvoort. The Chairman of that committee, or a member of that committee, will please now report.

The report of the committee was then read, as follows:

Your Committee beg leave to report, that they have carefully considered the paper presented by J. B. Nagelvoort, entitled "Advance Sheets of an Analytical Companion to the United States Pharmacopœia, Seventh Edition."

We find it contains many very valuable suggestions that are of great service, but inasmuch as the paper is presented accompanied by the proposition that it shall be published in the style of the National Formulary and issued at cost to our membership, involving expense, and also from other considerations outside the province of the Section on Scientific Papers, we recommend that the paper be referred to the Council with the suggestion that the information contained in this paper be placed by the author at the disposal of the Committee on Revision of the United States Pharmacopœia at an early date. Signed,

EDGAR L. PATCH,
OSCAR OLDBERG,
JNO. N. HURTY.

THE CHAIRMAN: You have heard the recommendation of the committee; what is your pleasure?

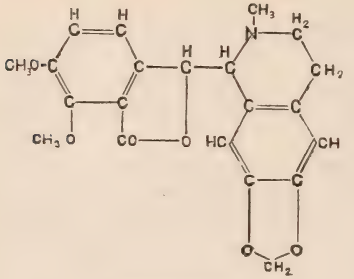
Upon motion, the report of the committee was adopted.

The next paper called for by the chairman was that presented by Dr. Dohme in answer to Queries 14 and 15 sent out by the Committee. The paper was read by the author, and at its conclusion was submitted for discussion.

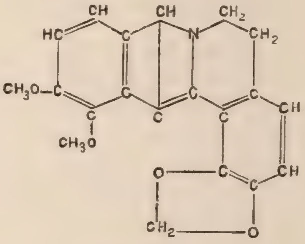
THE RELATION OF HYDRASTINE AND BERBERINE TO ONE ANOTHER, AND THEIR MODE OF COMBINATION IN THE DRUG.

BY ALFRED R. L. DOHME, PH. D.

These two alkaloids, for many years regarded as identical, occur together in the root of Hydrastis Canadensis. Berberine, however, occurs in other plants besides the latter, and it was because of this fact that the white alkaloid was overlooked at first in the root of Hydrastis Canadensis, and, even after it was isolated, many pharmacists still called it berberine. Berberine was isolated in 1826 from the bark of Xanthoxylum clava Herculis by Chevallier and Pelletan,[1] who called it Xanthopicrit. Büchner[2] observed it in 1837 in the root of Berberis vulgaris, and Perrins[3] extracted it from the root of Hydrastis Canadensis in 1862, although Durand[4] had already observed it eleven years before, without, however, isolating or closely examining it. Hydrastine has the formula[5] $C_{21}H_{21}NO_6$, while Berberine has the formula $C_{20}H_{17}NO_4$,[6] from which facts we may infer that the two alkaloids are not identical, though probably closely allied in constitution. Both are tertiary bases, and both have been very carefully studied and their constitution unravelled. By a beautiful series of experiments Freund[7] showed pretty conclusively that the molecule of hydrastine was constituted as follows:



HYDRASTINE.



BERBERINE.

just as Perkin[8] showed that berberine was made up as above given, at the same time making plain its relation to papaverine, narcotine and hydrastine. This will be made clearer by inserting the formulas of the two opium alkaloids, narcotine and papaverine, which respectively Roser[1] and Goldschmidt,[2] by their exhaustive and beautiful investigations have unravelled so that their constitution is as well known and established as are those of hydrastine and berberine.

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[1] Chevallier and Pelletan, Journal de Chimie médicale, 2, page 314.

[2] Büchner, Annalen der Chemie, 24, page 228.

[3] Perrins, Annalen der Chemie, Suppl. 2, page 172.

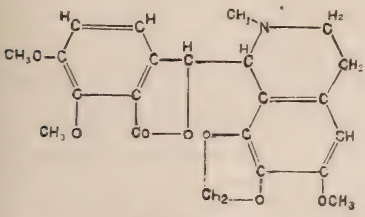
[4] Durand, Amer. Jour. Pharmacy, 23, page 112.

[5] Freund and Will, Berichte der Deutsch. Chem. Gesell., 19, page 2797.

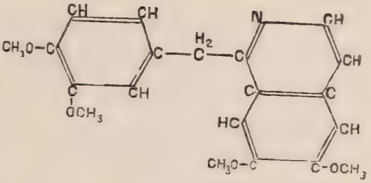
[6] Perkin, Journal Chem. Society, 1889, I., page 63.

[7] Freund, Berichte der Deutsch. Chem. Gesell., 22 pp., 456, 1156 and 2349.

[8] Perkin, Journal Chem. Soc., 1890, page 992.



NARCOTINE.



PAPAVERINE.

A close scrutiny will show many points of similarity between these four alkaloids, and this similarity in grouping was beautifully verified by experiment, for all four investigators obtained one or more common decomposition products during the course of their work. As improbable as it appears at first glance that from the empirical formula of hydrastine, $C_{21}H_{21}NO_6$, and the same is true of the remaining three alkaloids, one can show conclusively that these forty-nine atoms are grouped relatively to one another as is given in the above formula, yet our science has developed so wonderfully and is now possessed of so many established landmarks that in rambling over even such complicated ground as alkaloids flourish in, the skillful hunter may readily locate himself and secure his game. To follow any of these famous huntsmen through their rambles would be a delightful and interesting trip and a very instructive one, but it would lead us from our road and take up too much valuable time. The relation of hydrastine to berberine the above formulas make plain, and whereas they are both derivatives of isoquinoline or rather of tetra-hydro-isoquinoline, there is sufficient difference in the way in which the di-methoxylated benzene ring is united to the isoquinoline ring to account for the difference in properties possessed by the two alkaloids. This brings us to a very interesting side-path in our journey, but one that will ere long become a very large and populous thoroughfare, and that is the relation of constitution to therapeutic effect, a path which pharmacology has knifed out of our alkaloidal jungle. It is this beautiful and highly interesting as well as important subject of pharmacology that justifies the labor involved in trimming bare of jungle and underbrush the many-branched trees we have just seen, for it will only be a question of time when the cause of the effect of our potent medicines will be discovered and only from a knowledge of the position, extent and nature of the branches of our family of trees. Let us observe a little more closely the hydrastine and narcotine trees, which at first glance appear almost identical. There is only one slight difference, the narcotine tree has one branch OCH_3, a methoxyl group, that the hydrastine tree has not, and what a difference in properties both physiological, chemical and physical has this one small branch caused—a veritable revolution in properties.

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[1] Roser, Annalen der Chemie, 245, 247, 249 and 254.

[2] Goldschmidt, Monatshefte für Chemie, 4, 6, 7, etc.

Another valuable feature of this study of chemical constitution is this, that when our jungle has become sufficiently pruned to render it worthy the name of garden we may be led in many instances, by analogy in the branching of the trees, to look for some physiological effect in a certain compound that we had never thought of before. Such observations have been made by chance in the past, notably in case of cocaine, but then they will be the verification of a theory deduced from facts. Among the trees that are at present being pruned are morphine, quinine, santonine, aconitine, nicotine, cotoine and others.

As to whether hydrastine and berberine exist in the drug in the free state or combined with an acid, we can say that everything seems to point to the former alternative. The following facts speak for themselves: Golden seal root may be extracted in the cold by means of ether or benzene, without the addition of any base whatsoever, and the result will be that almost if not all of the alkaloids will be found in the extracting menstruum and will crystallize therefrom as free alkaloids. This I have found to be true in all the cases I have tried, and Dr. Freund, who has probably worked more with this drug than any other investigator of to-day, has informed me recently that he never did lay hands on an acid if one was there, but on numerous occasions obtained the alkaloids as such from cold extractions of the drug by means of ether or benzene without the use of a base. It is hence very probable that hydrastine and berberine exist in golden seal root in the free state.

Baltimore, July 2, 1894.

MR. T. L. A. GREVE: I see that this paper begins with the statement that these two alkaloids were for many years regarded as identical. Now I myself have abstracted two alkaloids as early as 1854, berberine in the form of muriate, and hydrastine as an amorphous precipitate. In 1862 hydrastine was obtained in very fine crystals in the laboratory of the W. S. Merrell Chemical Company. In this connection it would be perhaps proper to raise the question whether berberine from hydrastis is identical with the berberine obtained from Berberis vulgaris, which to me seems doubtful.

MR. KEBLER: The relation of hydrastine to berberine seems to be a very important question. We would like as much information on this subject as Dr. Dohme can give.

THE CHAIRMAN: After giving opportunity for other questions—if there are any other questions or remarks—I would like the writer of the paper to have the opportunity of closing.

MR. LLOYD: I believe I am already on record in Drugs and Medicines of North America so far as the historical point concerning the bodies is concerned. The first active principle of Hydrastis as made by Rafinesque in 1828, was then called hydrastine, and that was before it was called berberine in the old country. The word berberine came afterwards, being applied by Buchner and Herberger, 1830, to a mixture of extractive substances from Berberis vulgaris, who being more conspicuous than Rafinesque (who as before stated, referred to it in 1828 as hydrastine), established the word berberine in Europe. I am not aware that the yellow alkaloid of hydrastis known now as berberine, and the white alkaloid known now as hydrastine, have ever been considered identical. I would, however, infer Dr. Dohme to indicate in his first sentence that they have been confused, which I think is an error. As regards the final clause in Dr. Dohme's paper, it seems to me that we have yet much to investigate concerning the natural relationships of the alkaloids in drugs. I would like in this connection to ask Dr. Dohme whether he obtained his free berberine from the fresh or whether it was from the dry hydrastis—I question if we have considered the effect that drying the drug has upon the production and liberation of alkaloids.

MR. EBERT: In 1861 an investigator, Dr. F. Mahla, made the first announcement that the article that was in the market known as hydrastine, and so put up by the manufacturers of the eclectic remedies, was a berberine salt. Subsequently Dr. Mahla made an ultimate analysis and gave the first chemical composition of hydrastine—that is, of hydrastina, the composition of which was declared not to be correct. That is the history of it as far as that point goes.

MR. HALLBERG: This subject calls to our mind again the question as to the different drugs we obtain for experiment—whether fresh or dry—and according as the drug is obtained in the fresh or in the dry state, as to whether that menstruum employed contains water or not. Now this is an important question, and I believe that if any menstruum containing water is used, then an acid will be formed in the drug, and hence, the presence of acid in the drug as accepted by the various authors—hydrastinic acid. I would like to ask—I think it is an important question connected with the subject—why hydrastine is not official and hydrastinine is official. With the permission of the Chair I would like to ask some member of the sub-committee on the organic chemicals of the Pharmacopœia Committee on Revision—Dr. Eccles, for example, a member of that committee—why the alkaloid was not made official, and why hydrastinine was made official. I have no evidence and I have never found any druggist that has ever heard of its being prescribed—I don't know why it was introduced into the Pharmacopœeia.

THE CHAIRMAN: I will ask if there are any further remarks, or would you like to have the question answered immediately?

MR. HALLBERG: If the Chair permits it.

THE CHAIRMAN: Will Dr. Eccles answer the question?

DR. ECCLES: At the time the committee was at work upon these alkaloids there was a very great excitement in the region of Brooklyn and New York, especially about hydrastinine and its use—it was being prescribed quite freely. If it is not quite freely and generally prescribed in Chicago, it is certainly prescribed in Brooklyn. We can give it in much smaller dose, and gain results which cannot be gained by using the other. A goodly number of physicians in the neighborhood where I am to-day use hydrastinine. A gentleman of the committee was responsible for the omission of hydrastine. It was not a sub-committe, the sub-committee took the material laid before them, and worked it up, and it went in to the General Committee, and was voted upon by them, and hydrastinine was introduced, while hydrastine was left out.

THE CHAIRMAN: Is there any other question? The Chairman would like to give to those who have not spoken twice, an opportunity to speak. If the Association so rules, I will ask the gentleman who spoke first—Dr. Greve.

DR. GREVE: What I wished to say has already been referred to by other speakers.

MR. LLOYD: I wish to thank Dr. Dohme personally, and I think that the Association should extend thanks for this work done in the direction of hydrastine and other substances. It is probable when we understand thoroughly the chemistry of all these alkaloids and can look at the composition, and can unite the links of the chain as has been done here, that there will be another field, and that this is a stepping stone to a higher chemistry.

THE CHAIRMAN: Before asking Dr. Dohme to make any final remarks, I would ask if Mr. Morrison is in the room, and if so, if he will please step forward.

DR. DOHME: I will endeavor to answer the questions in the order in which they have been put. The first was in reference to the fact of the identity of these two alkaloids. That was due to the fact, as Mr. Lloyd first pointed out, that the first alkaloid isolated was called hydrastina in the United States, and sometime afterwards a yellow alkaloid was isolated in Europe called berberina, neither of which was pure. As the berberina came from Europe and was the latest isolated, its name was adopted for both alkaloids by many pharmacists. As a matter of fact, most of the berberina contained hydrastina and vice versa.

With reference to the remark about the relative quantity of the two alkaloids in Hydrastis Canadensis, I would say that it varies with the drug to a large extent—three of berberine to two of hydrastine is about an average proportion.

In reply to Prof Lloyd's question whether dry or fresh drug was used, I would say that my experiments were made with the dry drug. I have made no experiments with the fresh drug, but shall, however, take pleasure in doing this during the course of the winter if I find occasion.

I wish furthermore to make a statement in this particular which may be surprising, and that is, that in recent assays I found golden seal root to contain as much as three per cent. of hydrastine gravimetrically, hydrastine being indifferent to acids and thus precluding the use of the volumetric acid solution. The process used was that of Keller, of Zurich, Switzerland, which method, as far as I have examined, is the most reliable and satisfactory for extracting alkaloids. I have tried it for ipecac, belladonna, ergot and hydrastis, and find it superior, as far as the amount of alkaloid extracted is concerned, to all other methods tried. Mr. Keller is himself applying it to all drugs, as he recently informed me by letter.

In reference to hydrastinine, referred to by Prof. Hallberg and Dr. Eccles, this is a decomposition product of hydrastine which naturally must have somewhat different properties, if therapeutics are in any way dependent upon the chemical constitution. If the white alkaloid hydrastine is boiled with dilute acids, it takes up an atom of oxygen and a molecule of water to form hydrastinine and opianic acid. This is exactly analogous to the decomposition of narcotine by dilute acids when cotarnine and opianic acid are formed.

MR. EBERT: Dr. Dohme has just referred to narcotine. I would like to ask him if he knows or can give us the medicinal or therapeutic effect of narcotine. I would like to be enlightened on that subject. I have never been able for the last twenty years to find out what its effects are on the human system.

DR. DOHME: I would say in reply that the only use I know of its being put to is that of a hypnotic.

MR. EBERT: I would like to ask the Doctor whether he has ever known it to be used as a tonic in large doses?

DR. DOHME: No, sir.

MR. EBERT: Can you explain that?

DR. DOHME: No, sir: what I wish to say on this subject is, that it should be cleared up by somebody. Narcotine undoubtedly has some value in medicine, and it remains for the pharmacologists to tell us what this is.

MR. LLOYD: I do not like to see this paper misrepresented as it is—the first sentence stating that the two alkaloids were for some time regarded as identical—the yellow alkaloid and the white alkaloid. Confusion existed as to the yellow alkaloid only, which was called hydrastine in this country and berberine in Europe.

THE CHAIRMAN: If there are no other remarks, we will proceed to the reading of the next paper.

Mr. Kebler then read the following paper:

ANALYTICAL ALKALOIDAL CHEMISTRY.

THE RELATIVE VALUE OF GRAVIMETRIC METHODS, MAYER'S REAGENT AND TITRATION WITH VOLUMETRIC ACID SOLUTIONS IN ASSAYING ALKALOIDAL DRUGS AND GALENICAL PREPARATIONS.

BY LYMAN F. KEBLER, PH. C., B. S.

A century has nearly elapsed since the discovery[1] of the first alkaloid, "morphium," by Sertürner, and yet how inefficient and unsatisfactory are the methods generally employed in our era for estimating these active principles.

The earliest methods devised for the detection and estimation of alkaloidal poisons in forensic chemistry were those found effective in removing the alkaloids from the inert matter associated with them in nature. The material was first extracted with dilute acids, aided by gentle heat, the gummy matter and other substances removed with lead acetate, excess of lead precipitated with hydrogen sulphide, and the alkaloid obtained as an impure alkaloidal salt, generally an acetate.

Nearly all of the methods now employed are based on the principles of immiscible solvents introduced by F. J. Otto[2], in 1856, as a modification of J. S. Stas'[3] method for the recovery of alkaloidal poisons. Ether was first so employed, then followed chloroform[4], amylic alcohol,[5] and finally

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[1] Dict. Applied Chem. (Thorpe), vol. *3*, page 900; Handwoerterbuch der Chemie (Ladenburg), Vol. I., page 214.

[2] 1856, F. J. Otto, Ann. (Liebig), *100*, 39.

[3] 1852, J. S. Stas, Bull. de l'académie de médecine de Belgique, *9*, 304; Ann. (Liebig), *84*, 379; Jahresber. der Chemie, page 640.

[4] 1857, J. E. D. Rodgers and G. P. Girwood, Pharm. J. Trans., *16*, 497.

[5] 1861, L. Uslar and J. Erdmann, Ann. (Liebig), *120*, 121.

G. Dragendorff[1] presented a comprehensive scheme for separation by solvents immiscible with water applied in both acid and alkaline solutions. The plan of separation first published in pharmaceutical journals, primarily for the use of toxicologists, has been extended by chemists everywhere and in every direction, so that it has become the most convenient method of separating alkaloids for analytical work and manufacturing purposes.

Ingenious and comprehensive as are some of the recognized methods based on the above principles of immiscibility, nevertheless the results are frequently wide from the truth as generally arrived at gravimetrically. Not that the gravimetric part of the assay is deficient, for that portion of the process is recognized as the most reliable of all methods, but the extraction of inert matter through the agency of immiscible solvents prior to the weighing is the detrimental part. Extract the acid solution as long as you please with a given immiscible solvent, yet on rendering the solution alkaline there appears to be a certain amount of the material rendered soluble in the solvent employed. In some cases the quantity is inappreciably small, in others it composes the greater part of the alkaloidal extract. How to eliminate these foreign, not always inert substances, is a question frequently harassing us. As types of the gravimetric processes containing this objectionable feature may be mentioned the methods of Lösch, Hager, Lyons, Lloyd, Thompson, Beckurts, Dietrich, etc.

It is not necessary to go into the merits and demerits of the methods, suffice it to say that each is favored with both more or less. Even the officially recognized method for assaying opium and opium preparations comes to share the spoils in this direction, for as high as two per cent of foreign matter has been found in some of the samples of morphine obtained by this process.

To be sure there are special methods for separating alkaloids in a state of purity, as that introduced by Scheibler,[2] based principally on phosphotungstic acid and chloroform; another initiated by T. B. Groves,[3] using potassio-mercuric iodide and an immiscible solvent; also a third method based on Sonnenschein's reagent,[4] sodium phosphomolybdate, and an appropriate solvent. By employing these latter processes, we are enabled to secure a product of considerable purity, at no inconsiderable loss however. Nor is this all, but these methods can be neither expeditiously executed nor economically employed in an analytical laboratory where many analyses are made daily.

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[1] 1867, G. Dragendorff, Pharm. Ztschr. f. Russ., *6*, 663; Russ. Arch. f. gericht. Med. J. *1*; Ztschr. anal. Chem., *7*, 521.

1876, Die gericht. chem. Ermittl. v. Giften, page 141.

TRANSLATIONS: A. B. Prescott, 1875; Outlines of Proximate Organic Analysis, page 136; S. D. Hayes, 1876; Am. Chem., *6*, 378.

H. G. Greenish, 1884; Plant Analysis, Eng. Ed., page 48.

[2] 1872, Tageblatt, der Versammlung deutscher Naturforscher und Aerzte zu Leipzig, page 115; 1873, Ztschr. Anal. Chem., *12*, 315.

[3] 1864, Pharm. J. Trans., (*2*), *6*, 268.

[4] 1857, Ann. (Liebig), *104*, 45.

The germ of a very important method was introduced by P. Boully,[1] later announced by P. A. von Bonsdorff[2] and F. L. Winckler,[3] in the alkaloidal reagent potassium mercuric iodide. A. von Planta-Reichenau[4] reported the use of the tenth-normal solution of this reagent, substantially as presented in its practical form by F. F. Mayer.[5]

Most alkaloids are completely precipitated from aqueous acid solutions by a solution of potassium mercuric iodide. It has generally been assumed that these iodomercurates consist of a double iodide of the base with mercury, but there is a great discrepancy between fact and theory when attempting to verify this general assumption. The precipitates are far from being constant, varying with the degree of concentration, temperature, manner of adding the reagent, and many other minor points. Titrations executed under the same conditions precisely, often vary appreciably from one another, although they give close approximations to the truth in some instances.

A point deserving especial mention in this connection, is what may be termed equilibrium; that is, a condition in titration of such a nature that on addition of either the reagent or the alkaloidal solution, a further precipitation occurs.

In spite of the imperfections clustering around this method, it certainly extends to us a tempting short cut to arrive at comparative values of the various alkaloidal plants, and contains in it a step (titration) which introduces us to a truly scientific method; titration with volumetric acid solutions; which consigns Mayer's reagent to the past as of quantitative value.

The employment of volumetric solutions in estimating the potency of alkaloidal plants, is current with alkaloidal chemists abroad, and heartily sanctioned by many of our fellow-countrymen; nay, some have even expressed themselves publicly as to its being the only scientific and reliable method. It is to the latter that the writer would bring a word of encouragement. For some time the author has been collecting data bearing on this point, which are expressed in the table below.

That this method is confronted by no obstacles no one claims; in fact, we frankly admit that several questionable elements enter it *prima facie*, and give reasons of doubt as to its absolute correctness. Taking these defects and calculating them at the utmost, we find ourselves nearer the truth than by the results obtained by the general gravimetric methods.

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[1] 1827, Ann. der Phys. Pogg., *87*, 99; Ann. Chim. phys., (2), *34*, 345.

[2] 1829, Ann. der Phys. Pogg., *93*, 243.

[3] 1830, Buchner's Repertorium, *35*, 57.

[4] 1846, "Das Verhalten der Alkaloide gegen Reagentien," a dissertation at Heidelberg.

[5] 1862, Am. J. Pharm., *35*, 20; Chem. News, 7, 159; Chem. News, *8*, 177 and 189.

NOTE.—For additional literature collected by the author and reported by A. B. Prescott, see Am. Chem. J., *14*, 6c6.

The *first* defect deserving of mention is our imperfect knowledge of the molecular weights of several of the alkaloids, as emetine, aconitine, gelsemine, etc. This deficiency can be obviated only by diligent research, which will furnish us with the needed formulæ. The *second* defect lies in this, that some of the drugs contain two or more alkaloids of different molecular weights, as nux vomica, cinchona, aconite, etc. This compels us to assume that the alkaloids exist in a certain relative proportion in order to arrive at a molecular weight on which to base our calculations, and can be remedied only by determining by careful analyses the definite amount of each alkaloid.

When we reflect a moment on the advancement the volumetric method represents, all with one accord must say that the amount of alkaloid represented by each titration is absolutely correct. A point in this connection should, however, engage our serious attention, and that is the method employed for extracting the alkaloid. One method is better suited for one drug than another, consequently we should endeavor to so execute our work that each drug be thoroughly tested by a number of workers with every economical process, and that process giving the most uniform results, as well as the highest, should be the one adopted by all alkaloidal chemists. Mr. Karl Schwickerath[1] has set us a most excellent example in his study of the "perforation method."[2] The result will be that a preparation standardized in California will have the same therapeutical strength as a similar article assayed in Maine. As it is at present, almost every analyst uses a different process for standardizing and assaying a given drug, and the results are as variable as are the number of manipulators.

A single example sets forth the variability of the different methods with sufficient momentum to cause every diligent worker to reflect seriously. In the case of fluid extract of belladonna leaves, with the gravimetric processes the variability ranged from 0.493 per cent. to 0.401 per cent.; with the potassium mercuric iodide reagent from 0.781 per cent. to 0.763 per cent., and the volumetric method gave us from 0.223 per cent. to 0.214 per cent. The material was taken from the same bottle and all assays made within forty-eight hours of one another, with at least duplicates in every case.

In the table below are given the maximum, minimum and mean results of the majority of the practical gravimetric processes, Mayer's reagent and volumetric acid solutions.

The methods of procedure generally employed were those outlined in Allen's Com. Organic Anal., Prescott's Organic Anal., Lyon's Pharmaceutical Assay, Dragendorff's Die Chemische Werthbestimmung starkwirkender Drogen, and later methods in literature not collected and placed in text-books.

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[1] 1893, Bull. Pharm., *7*, 534, and 1894, Ibid., *8*, 246.

[2] 1893, Van Ledden Hulsebosch, Pharm. Centralhalle, *34*, 101.

Substance.	Gravimetric.			Mayer's Reagent.			Volumetric Acid.			Decinormal Factors.
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	
Aconite Root	1.140	1.060	1.100	1.320	1.261	1.210	1.013	0.937	0.975	0.0647
Fl. Ext. Aconite Leaves	0.431	0.301	0.366	0.428	0.315	0.371	0.297	0.193	0.242	0.0647
Fl. Ext. Aconite Root	0.826	0.700	0.763	0.975	0.923	0.949	0.645	0.605	0.625	0.0647
Fl. Ext. Belladonna Leaves (a)	0.493	0.401	0.447	0.781	0.763	0.772	0.223	0.214	0.228	0.0289
Fl. Ext. Belladonna Leaves (b)	0.356	0.325	0.341	0.349	0.325	0.337	0.315	0.303	0.309	0.0289
Fl. Ext. Belladonna Root	0.350	0.350	0.350	0.376	0.357	0.366	0.331	0.317	0.324	0.0289
Fl. Ext. Blood Root	1.710	1.531	1.620	1.135	1.091	1.113	Too much coloring matter.			
Fl. Ext. Red Cinchona	5.134	3.562	4.343	Unreliable.			4.521	3.833	3.142	0.0314
Fl. Ext Cinchona, Comp	1.844	1.524	1.684	Unreliable.			1.315	1.613	1.464	0.0314
Fl. Ext. Coca Leaves	0.627	0.456	0.541	Unreliable.			0.621	0.440	0.531	0.0303
Fl. Ext. Colchicum Root	0.397	0.352	0.374	0.647	0.561	0.604	Unsatisfactory.			0.0399
Fl. Ext. Colchicum Seed	0.707	0.453	0.580	0.971	0.646	0.808	Unsatisfactory.			0.0399
Fl. Ext. Conium Fruit.	0.776	0.631	0.653	Unreliable.			0.680	0.521	0.600	0.0127
Fl. Ext. Gelsemium	0.397	0.314	0.355	0.497	0.450	0.478	0.367	0.301	0.334	0.0408
Fl. Ext. Guarana	3.809	3.746	3.777	Does not precipitate.			Impracticable.			
Fl. Ext. Henbane	0.179	0.114	0.146	0.308	0.212	0.260	0.152	0.112	0.132	0.0289
Fl. Ext. Hydrastis, Berberine.	2.839	2.756	2.847	Unsatisfactory.			2.536	2.431	2.483	0.0335
Fl. Ext. Hydrastis, Hydrastine	2.000	1.931	1.965	Unsatisfactory.			1.634	1.457	1.545	0.0397
Ipecac Root	2.800	2.000	2.400	2.693	2.000	2.346	2.481	1.933	2.207	0.0254
Fl. Ext. Ipecac Root	2.371	2.163	2.212	2.265	2.192	2.223	2.133	2.002	2.062	0.0254
Fl. Ext. Jaborandi	0.621	0.533	0.577	Unsatisfactory.			0.540	0.413	0.476	0.0208
Nux Vomica Seed	1.813	1.752	1.787	1.911	1.832	1.871	1.732	1.698	1.715	0.0364
Fl. Ext. Nux Vomica.	1.698	1.631	1.664	1.496	1.401	1.448	1.521	1.501	1.511	0.0364
Solid Ext. Nux Vomica.	15.421	15.129	15.275	15.020	14.890	14.955	15.231	14.963	15.097	0.0364
Powd. Ext. Nux Vomica	18.435	18.209	18.322	18.013	17.973	17.993	18.103	17.941	18.022	0.0364
Fl. Ext. Stramonium Seed	0.473	0.397	0.435	0.375	0.356	0.365	0.385	0.312	0.348	0.0289
Fl. Ext. Stramonium Leaves	0.376	0.334	0.355	0.525	0.500	0.512	0.317	0.289	0.303	0.0289
Fl. Ext. Veratrum Viride	1.045	0.400	0.722	1.361	1.134	1.247	1.030	0.137	0.588	0.0687

A short perusal of the results portrayed in the above table clearly reveals the desirability of a more uniform system of assaying the various alkaloidal plants and their preparations.

In titrating with volumetric acid solutions the indicator is one of the first factors to be called into consideration. The behavior of the alkaloids with indicators presents some remarkable differences. Methyl orange can be used generally in titrating the alkaloids with mineral acids. Litmus and phenolphthalein[1] are applicable to the strongly basic alkaloids, but are worthless for the feebler ones. Lacmoïd has been employed by Van Itallie[2] for titrating certain alkaloids with hydrochloric acid, and E. Dieterich[3] used rosolic acid, but his results leave the value of the indicator in doubt. C. C. Keller[4] in his extensive communications on the valuation of drugs employs hæmatoxylin as the indicator and hydrochloric acid for titrating.

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[1] 1887, P. C. Plugge, Arch. der Pharm., (3), *25*, 45 and 49.

[2] 1879, Nederl. Tydsch. v. Pharm., Jan.; Analyst, *14*, 118.

[3] 1887, Pharmaceut. Centralhalle, *28*, 21; Am. J. Pharm., *59*, 179; Pharm. J. Trans., (3), *17*, 888.

[4] 1894, Wochenschr. f. Chem. u. Pharm., *32*, Nos. 5, 6, 7, 12 and 13.

Brazil wood has recently been reported as very efficient,[1] and adopted by the United States Pharmacopœia of 1890 for titrating nux vomica and its preparations, but cochineal has proven most efficacious in the writer's hands for all alkaloids.

In titrating with cochineal or methyl-orange it is seldom convenient to employ an aqueous solution of the alkaloid. A solution of the base in dilute alcohol is quite suitable, the indicators being very sensitive in this menstruum.

Occasionally the alkaloidal residue is abundantly contaminated with coloring matter, extracted with the alkaloid from its natural sources. In such cases the following ingenious method, due to A. H. Allen,[2] is very useful. Dissolve the residue in a small quantity of ether, transfer the solution to a small glass-stoppered cylinder, add a few cubic centimeters of water colored with the indicator. The standard acid solution is gradually added in drops and the solution well agitated after each addition. Under these conditions the end reaction is easily determined, for the coloring matter in the upper ethereal layer presents a strong contrast to the lower colored aqueous stratum.

The principles of volumetric analysis are so well known, that it seems quite unnecessary to give the method of procedure in detail.

The acid solutions found to give the most uniform and satisfactory results were twentieth-normal solutions of sulphuric and hydrochloric acids. The acid is added in slight excess, and titrated back with a centinormal solution of potassium hydroxide.

In conclusion, the writer would urgently recommend the adoption of a certain method for extracting the base or bases from each alkaloidal plant, and titrating the residue with a volumetric acid solution in order to obtain uniform results with every drug.

NOTE.—In answer to the query, With what drugs does the ferric hydrate process give uniform results? I would say that all of the drugs in the above table gave me satisfactory results as a gravimetric process, excepting aconite leaves and sometimes the root, belladonna leaves, coca leaves, conium fruit, henbane, jaborandi and veratum viride.

DR. BARTLEY: I should like to move that a committee of three be appointed by the Chair with a request that they report at the next meeting upon the question of indicators used in the alkaloidal assays by the volumetric method.

MR. HALLBERG: This paper will bear further discussion.

THE CHAIRMAN: Are there any further remarks? You have heard the motion—I suppose it is a reference to the meeting next year, and not the meeting this afternoon.

MR. HALLBERG: I second that motion.

The question being on the motion of Dr. Bartley, it was agreed to.

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[1] 1893, C. Caspari and A. R. L. Dohme, Am. J. Pharm., *65*, 473; Proc. Am. Pharm. Assoc., *41*, 118.

[2] Com. Organic Anal., Vol. *3*, pt. 2, p. 131.

MR. HALLBERG: I have not very much to say on this subject, because I do not know very much about it, but I have contended for ten years that when these pharmaceutical chemists reported results of the examination of the alkaloidal strengths of drugs and preparations made by the use of Mayer's reagent, such results were practically worthless, and I say that now. The time is rapidly arriving when this fact will become recognized. I have always contended that Mayers' solution gives results in the hands of different experimenters so variable as to completely vitiate any results that may be obtained. Now I also believe that the gravimetric method and the volumetric method, in five or ten years from now will be regarded in about the same way as we regard Mayers' solution at the present time.

I want to point out very briefly at first—the inquiry reads, "With what drugs does the Ferric Hydrate process give uniform results?" The comparison here is applied scarcely to drugs, but almost entirely to fluid extracts. Now I know that inasmuch as the method of examination does not involve the identificatation of the active principle itself by the tests recognized by the Pharmacopœia, that any experimental investigator should not start with the fluid extract unless he has made that fluid extract from the drug, so that he knows what he has got. This gentleman presents a long line of fluid extracts made by himself.

MR. KEBLER: They were made by myself or under my supervision.

MR. HALLBERG: Now he gives the results, which are simply intended to show the relative value of three different methods—it is very good work, but I hope that we will not accept the idea that these estimations of alkaloids are all definite in their character at the present time. I would like to ask if this method which has been attributed to Keller is not the same as that originally proposed by Beckurts?

MR. CASPARI: Keller's method is not Beckurts' method. Keller has recently begun an investigation in this matter and in the past year has written largely on the subject, and has given it as his opinion that the volumetric method is the only safe method in comparison with gravimetric results. The subject was stared two years ago at the meeting at the White Mountains, where I had the pleasure of making a few remarks on the subject. Since then manufacturing houses have taken it up all over the country. I think brother Hallberg a little in error in assuming that the volumetric method will be considered valueless in time to come; it will become a fixed fact, and be accepted by scientists just as the titration method for the determination of inorganic substances. All must agree that in the presence of impurities the percentage of alkaloids can be more acceptably determined by titration with volumetric acid solutions, in assaying alkaloidal drugs and galenical preparations. I have no doubt that instead of being pushed into the background, it will be brought into use more extensively hereafter.

MR. HALLBERG: Will the Chairman allow me to ask the gentleman a question on this subject?

THE CHAIRMAN: Yes, sir.

MR. HALLBERG: The only instance where the method is adopted in the Pharmacopœia is with reference to nux vomica in the standardization of its tincture and extract. Is the standardization in the present Pharmacopœia by this method of any particular value?

MR. CASPARI: Yes, sir; I think it is.

MR. HALLBERG: As long as it applies only to the total aldaloids, and makes no distinction between the relative proportions of brucine and strychnine? Some of the best therapeutists claim that perfectly pure brucine free from strychnine possesses very little toxicity.

MR. CASPARI: I do not think that the question of titration of alkaloids has anything to do with the toxic properties of these alkaloids. The Committee of Revision desired to fix a percentage of alkaloid in nux vomica preparations, and adopted this method because it was found to be the best method they had, after trying a large number.

MR. HALLBERG; Has it anything to do wifh the strength of nux vomica? If the proportion of brucine and strychnine in the alkaloid is the same, say fifty per cent., then we have a standard basis to go by; but suppose the proportion of strychnine is 60 or possibly 65 per cent.

THE CHAIRMAN: I shall have to ask that this paper be discussed, and not the Pharmacopœia.

MR. CASPARI: I am glad the Chair has ruled this way. I was replying to the question, and did not wish to discuss the Pharmacopœia, nor desire to sit in judgment on the Committee of Revision. In reading his paper the author stated that he had not found much difference between the volumetric and gravimetric results, and not as much as stated in a paper read before. Now I happen to be acquainted with the work of the sub-committee on Assays, and in ascertaining the value of some methods for determining alkaloids, the Committee on the Pharmacopœia found some very startling discrepancies. A sample of extract of nux vomica assayed gravimetrically by Beckurts' method showed nearly 22 per cent. of alkaloids, and yet the alkaloidal residue when titrated with volumetric acid was found to consist of three-fourths alkaloid and one-fourth impurities.

DR. ECCLES: I think the results here shown are such as will be more thoroughly shown in the same direction in the future, instead of less so, and the further we go on with this, the better we will be satisfied with the volumetric method, and the less satisfied with the other method. As to the remark made in regard to Mayer's solution, I don't think it was just—I do not think that Mayer's solution is such a bad thing as Mr. Hallberg seems to think: I think if a man works with it, and works carefully and keeps to the conditions in that work, his results will always be the same, as with any other solution of known strength, and by comparison he will do fairly good work. As far as the volumetric method is concerned he will come to a certain conclusion, and that is what Prof. Hallberg has been looking forward to—that there should be a method by which he will be able to take a mixture of crude alkaloids and separate one from another as brucine from strychnine, so that they may be determined separately. Something of that kind may be done in the future; at the present time, all that is possible to be done is to attempt to determine the combined alkaloids.

MR. ELIEL: I know very little about alkaloidal chemistry, but the question I would like this gentleman to answer is this: whether any methods proposed will work satisfactorily with Digitalis? I must say that I have not been able to isolate satisfactorily the alkaloid or satisfy myself about it.

THE CHAIRMAN: If you will allow the Chairman to call upon some one to answer that question, I will do so.

MR. ELIEL: I would be glad if you would do so.

MR. CASPARI: I think the general opinion to-day of those who have looked into the matter is pretty well settled, that we are not in possession of a satisfactory method for Digitalis. I had occasion recently to converse with Prof. Flückiger, a gentleman well posted in such matters, and he stated that he knew of no strictly reliable method for the valuation of Digitalis. An article has been put upon the market called "true digitalin," and Kiliani, a German chemist, claims to have extracted the true active principle of the drug, possessing all the characteristic cardiac activity, but no toxic properties. Kiliani has failed to publish his method for isolating the principle, but Boehringer & Sons manufacture it according to his directions.

MR. LLOYD: We can scarcely separate the first part of these methods from each other. The first step in both must be considered as being somewhat similar, the abstraction of the alkaloid from the drug, and the preparation of the fluid extract (different methods will also give different results)—this is the first step, and after the drug is abstracted then comes in the gravimetric and volumetric determination of alkaloids; under treatment by the volumetric method will be found some substances quite clear and others very indistinct, and we thus have on both sides a factor of uncertainty, and no method can be applied indiscriminately to all drugs and all preparations.

THE CHAIRMAN: Are there any further remarks? If not, the privilege of the Association will be extended to those who have made remarks to make further remarks.

MR. HALLBERG: May I ask Mr. Caspari a question, not on the proposed point, but upon another important question relating to this paper?

THE CHAIRMAN: Yes, sir.

MR. HALLBERG: It is the publication of investigations of this kind which educates pharmacists up to the point of believing in the satisfactory value of drugs and preparations which, as we call them, are standardized. There are a large number of standardized drugs for pharmaceutical purposes consumed in this country in which the alkaloidal strength is stated on the label, but when that alkaloidal strength varies from a certain standard that has been adopted, often arbitrarily by a manufacturer, then the directions for the preparation of galenical preparations of this drug are also varied by the manufacturer. For example, if Digitalis contains fifty per cent. more active principle than the manufacturer's own arbitrarily selected standard, then the formula for the preparation of the tincture on the package reads, take of the drug 10 parts instead of 15 parts and enough menstruum to make 100. Now I believe that this is entirely unwarranted and unscientific.

THE CHAIRMAN: You were going to ask a question.

MR. HALLBERG: The question is, whether a manufacturer would be justified in a case of this kind—Digitalis—if it has been proven to contain fifty per cent. more active principle than has been estimated by the manufacturer it should contain—to recommend that the tincture be made from 10 parts instead of 15 parts?

MR. CASPARI: In the first place it is necessary that I should set myself right at this meeting. I have no connection whatever with any firm in this country—I want to start out on this basis. When the manufacturer of powdered drugs finds that some contain a larger percentage of alkaloid than his established standard, I do not think that he is justified in modifying the official directions unless the Pharmacopœia itself has fixed a standard, and this is the case with only three drugs at present. In the absence of an official standard, no one, I claim, has the right to alter the quantities directed in the formulas of the Pharmacopœia, no matter how rich in alkaloid the drug may be.

THE CHAIRMAN: The discussion is upon the paper before us. Now it seems to me we are about run out, and I will therefore ask the reader of the paper to close the discussion.

MR. KEBLER: I think most of the questions have been fully answered. The subject of indicators has been referred to a committee, and there is nothing more to say about it.

The Chairman: I will appoint on the committee to consider this question of indicators Mr. Kebler, Dr. Dohme, and Mr. Caspari.

The following paper on Laboratory Notes was next read by its author, Prof. Patch.

LABORATORY NOTES.

BY EDGAR L. PATCH.

HYDROGEN DIOXIDE.

The statement has been made by different authorities that a remarkable difference exists in the medicinal value of solution of hydrogen dioxide, and in its stability.

Some assert that they get best results from a concentrated solution obtained by evaporating the official 10 volume solution to one-third its volume, producing a 30 volume strength.

Others pronounce such a product as worthless. This has led us to a series of experiments.

Using the United States Pharmacopœia 1890 process, and cold water only, 6000 Gm. barium dioxide yielded an average for three lots of 13,000 Gm. of 10.5 volume solution.

Using an ice bath, the same quantity of material gave an average for three lots of 16,700 Gm. With extra care 17,500 Gm. were obtained. These assayed 10.5 volumes, and were far within the requirements for residue and acidity.

The following table gives the character of these products:

	Volume Strength.	Residue on evaporating 10 C.c.	$\frac{N}{10}$ Alkali required to neutralize 10 C.c.
U. S. P. Standard. . .	10.	0.050	1.00
Lot 1	10.4	0.008	.75
2	13.44	0.040	1.00
3	15.34	0.028	1.30
4	12.67	0.005	1.00
5	9.97	0.007	.80
6	10.00	0.018	1.00
7	10.13	0.008	1.00
8	10.75	0.012	1.00
9	11.30	0.008	1.00
10	12.48	0.006	1.00
11	13.38	0.008	1.00
12	10.05	0.011	1.00

The following table gives the assay of several samples of barium dioxide:

1. 91.6 per cent.
2. 76.4 "
3. 86.8 per cent.
4. 93.6 "
5. 80. per cent.
6. 82. "
7. 80.4 per cent.
8. 79.6 "

The following table gives the result of examination of market samples :

Commercial.	Volume Strength.	Residue from 10 C.c.	$\frac{N}{10}$ Alkali for 10 C.c.
1	2.47	Excess.	Excess.
2	8.80	"	"
3	10.	"	"
4	7.3	"	"
5	8.5	"	"
6	10.8	"	"
7	10.4	"	"
8	9.1	0.040	5.00
9	10.4	0.020	4.00
10	10.7	0.008	1.50
11	10.75	0.008	5.50
12	10.5	0.007	3.00
13	13.3	0.008	2.80
14	10.8	0.005	3.20
15	10.2	0.005	3.40
16	10.3	0.003	3.70
17	11.3	0.005	3.40
18	9.2	0.006	3.20
19	9.2	0.250	3.80
20	9.1	0.008	5.
21	8.5	0.020	3.50
22	9.9	0.015	5.50
23	14.7	0.022	5.
24	7.7	0.022	7.00
25	7.3	....	46.00
26	5.1	Excess.	Excess.
27	4.9	"	"
28	7.7	0.020	7.00
29	8.79	0.16	5.00
30	8.9	0.037	7.50

Medicinal.	Volume Strength.	Residue from 10 C.c.	$\frac{N}{10}$ Alkali for 10 C.c.
1	9.5	0.060	2.5
2	11.31	0.009	.8
3	10.86	0.012	.75
4	8.17	0.015	.8
5	9.63	0.018	1.00
6	11.00	0.007	.75
7	12.71	0.021	2.5
8	12.15	0.012	.5
9	12.2	0.005	.6
10	10.15	0.020	1.15

The following results were obtained by evaporation of different samples :

1. Commercial—assaying 8.8 vol., excess of acid. Evaporated at low temperature with constant stirring, 200 C.c. to 130 C.c.assayed 9.1 vol. Continued to 15 C.c. assayed .22 vol.

2. Commercial—assaying 7.5 vol., 200 C.c. to 100 C.c. assayed 9.8 vol. Continued to 60 C.c. assayed 9. vol.

3. Medicinal—assaying 10.86 vol., deficiency of acid. 300 C.c. to 75 C.c. gave 41.66 vol., should be 43.44 vol., loss 1.78 vol.

4. Medicinal—assaying 8.17 vol., 100 C.c. to 26. C.c. assayed 31.2 vol.

5. Medicinal—assaying 9.9 vol., 200 C.c. evaporated to 15 C.c., diluted with distilled water to 50 C.c assayed 25 vol., loss 14.6 vol. or about 37 per cent.

6. Medicinal—assaying 9.9 vol., 200 C.c. allowed to stand open 36 hours then evaporated to 50 C.c. assayed 26.86 vol., loss 12.74 vol. or about 32 per cent.

7. Medicinal—assaying 9.9 vol., 200 C.c. evaporated quickly to 50 C.c. assayed 34.35 vol., loss 5.25 vol. or about 13 per cent.

CARBOLIC ACID.

Colored Solution. Complaints having come to our attention of a colored solution produced by an acid of United States Pharmacopœia requirements, examination showed the color to be due to the iron in the water that had been standing in an iron pipe. Dissolved in distilled water the solution was colorless.

Water in High Grade Acid. Acid sold as United States Pharmacopœia was tested with the following result:

Drum 1, 270 pounds. Fused 32.5° C., boiled 167° C. Tested for absolute phenol by the United States Pharmacopœia 1890, volumetric method, it indicated 95.64 per cent. phenol. Exposed on bath for some time, the fusing point was raised to 36.5° C., the boiling point to 175° C., and the absolute phenol to 96.64 per cent.

Drum 2 fused 33° C., boiled 167° C. Drum 3 fused 34° C., boiled 167° C. Drum 4 fused 33° C., boiled 170° C. Drum 5 fused 34° C., boiled 170° C.

REDUCED IRON.

"What is the quality of the Reduced Iron dispensed?" Ferrum Reductum United States Pharmacopœia, 1890, is tested for its percentage of metallic iron by digesting with warm solution of bichloride of mercury, ferrous chloride being produced from the metallic iron accompanied with the reduction of the bichloride to calomel and metallic mercury.

The acidulated, filtered solution of ferrous chloride is titrated with $\frac{N}{10}$ Sol. of Potassium Permanganate.

The result is confirmed by the addition of alcohol to discharge color and of Potassic Iodide and starch solution, the free iodine estimated by $\frac{N}{10}$ Sol. of Sodium Hyposulphite. 80 per cent. of metallic iron should be indicated.

The 1880 United States Pharmacopœia relied upon the discharge of iodine color in solution of iodine in potassic iodide after two hours digestion, but this test was inaccurate owing to the great variation of the temperature of reaction, one operator expelling an excess of iodine during the two hours heating, and giving his product a favorable test.

Using an excess of iodine and correcting by titration with sodium hyposulphite, the same error might be made.

In the United States Pharmacopœia 1890 test, if the mercuric chloride is completely reduced to mercury and all its chlorine radical made available for the iron, then an atom of iron (55.9) would require a molecule of mercuric chloride (270.54), and the .56 of iron would not require more than the 50 C.c. of 5 per cent. solution containing about 2.5 Gm. of corrosive sublimate—while if the iron was only 80 per cent. pure, it would not require more than 2.164 Gm.

Failure to observe a sufficient temperature during digestion may give an insufficient reduction at the end of an hour, the result being a mixture of ferrous chloride, calomel, mercury and unchanged iron.

After digestion with mercuric chloride, the residue from filtrate was treated with diluted hydrochloric acid and then titrated with permanganate to determine ferrous oxide. A fresh portion of the sample was dissolved in diluted hydrochloric acid, oxidized with nitric acid, precipitated by ammonia, and ignited to determine total iron.

EXAMINATION OF TEN SAMPLES.

	U. S. P. 1890, Per Cent. Metall. Iron.	U. S. P. 1880, Per Cent. Metall. Iron.	Per Cent. Ferrous Oxide.	Per Cent. Ferric Oxide.	Per Cent. Total Iron as Metal.	Sulphide.	Alkalinity.
Iron Wire	98						
No. 1. Gray, labelled 80 per cent	58.5	61	25.7	......	......	Excess.	Neutral.
No. 2. Gray, labelled 60 to 70 per cent.	58	50	15.4	......	......	......	"
No. 3. Gray, labelled U. S. P.	76	73	7.7	20	96	......	"
No. 4. Gray, U. S. P.	65	......	12.8	27.8	94.5	......	"
No. 5. Black	27	25.8	65	......	......	......	"
No. 6. Black	13	16	......	......	......	......	Slight. alk.
No. 7. Gray, labelled 60 to 65 per cent	33	......	......	......	......	......	"
No. 8. Gray	61.6	......	......	......	......	......	Neutral.
No. 9. Black	60	......	......	......	......	......	"
No. 10. Gray	60	......	......	......	......	......	"

THE CHAIRMAN: Are there any remarks upon the paper? The paper is now open for discussion. If there are no remarks we will proceed with the reading of the next paper.

MR. HALLBERG: I would like to ask Prof. Patch if he has any new ideas in reference to the coloration of carbolic acid?

MR. PATCH: I have not. I have read everything, I think, in relation to that, and have had access to the journals and to all the best authors, and I am not satisfied with my knowledge with reference to it. I have written to manufacturers abroad, who supply largely our product, and one has stated that the coloration was due to the fact that the pharmacists manipulated the acid—that is, treated it so that it absorbed water—being hygroscopic, it would absorb one per cent. of water very readily. It is said to be decomposed very readily by light alone.

MR. THOMPSON: I would like to ask Mr. Patch, in making this solution of hydrogen dioxide—his paper referred only to that made from the barium peroxide—whether he has tried sodium peroxide?

MR. PATCH: I have not tried that at all, for the reason that commercially it was more economical to use the barium dioxide. I think Dr. Squibb gives quite a full answer to that in his formulas.

MR. THOMPSON: Dr. Squibb, in attempts with sodium peroxide, says that it may be used, and is much more economical than barium dioxide, that is, he could isolate the hydrate of sodium and get it out of the solution, and it would be a much more economical process than the barium process.

THE CHAIRMAN: If there are no other remarks, we will proceed with the reading of the next paper, on "Notes on the Behavior of Ferratin and Albuminate of Iron, with Artificial Gastric Juice," by J. O. Schlotterbeck and S. R. Boyce.

The paper was then read by Mr. Schlotterbeck.

NOTES ON THE BEHAVIOR OF ALBUMINATE OF IRON AND FERRATIN WITH ARTIFICIAL GASTRIC JUICE.

BY J. O. SCHLOTTERBECK, PH. C., B. S., AND S. R. BOYCE, PH. C.

These notes are a continuation of a portion of a study upon "Hæmoglobins and Their Related Products," which was conducted by Mr. C. H. Williams, as a thesis for graduation in the School of Pharmacy, Ann Arbor, and which appeared in the *Pharm. Rundschau*, September, 1894.

Ferratin is a new synthetical compound of iron, claimed by Schmiedeberg to be identical with the form of iron which he extracted from swine's liver. It is an acid albuminate containing about 6 per cent. of iron, and said to be made according to the following general outline:

Acid albumin, which is made by precipitating alkali albumin with a mineral acid, is combined with potassa to form potassium albuminate. By the addition of a chemically neutral ferric salt to a neutral solution of potassium albuminate, a precipitate of albuminate of iron is obtained. If this albuminate be dissolved in dilute alkali and subjected to moderate heat for some time, a new compound of iron called ferratin can be precipitated by adding dilute acids.

In a recent paper, which was read before the Cincinnati Academy of Medicine by Dr. G. A. Fackler, and which was published in the Cincinnati *Lancet-Clinic*, April 7, 1894, the following advantages (partially quoted from Schmiedeberg's original paper) of this preparation over other artificial albuminates of iron are claimed:

I. "In ferratin we have a compound which, because of the fact that it is not altered in the stomach or intestinal tract, is wholly absorbed and made available."

II. "Ferratin, due to the intimate union between it (iron) and the albumin, is so slowly attacked by the sulphuretted hydrogen that it is absorbed before an alteration into the sulphide can occur."

III. "Since, as a rule, the food which we ingest has been subjected to heat during the process of its preparation, and since, in the above process (that of separating the natural iron compound from pig's liver), no other force but heat has been employed, we undoubtedly secure in this compound that form of iron which enters the stomach with animal food and which is, in part, absorbed and deposited in the various organs."

In view of the fate which all previously known artificial albuminates of iron are believed to meet during their passage through the digestive tract, these claims and conclusions are remarkable ; therefore we have considered it desirable to make a few observations on the comparative behavior of simple albuminate of iron and ferratin with gastric digesting fluid.

In order to determine the exact extent of change in these preparations produced by this digestive action, it was necessary to determine the percentage of iron which they contain. A known weight of each was incinerated and ignited in platinum crucibles to Fe_2O_3, which was weighed as a check on the volumetric determinations which followed. This residue was dissolved in strong HCl, excess of acid driven off, the liquid diluted with water and nearly neutralized with alkali, and aliquot portions titrated with hyposulphite of soda. In other aliquot portions the HCl was transposed by H_2SO_4, the iron reduced with Zn and the resulting $FeSO_4$ titrated with $\frac{N}{50}$ $KMnO_4$. In one sample of ferratin our results agreed exactly with those obtained by Mr. Williams, namely, 5.7 per cent., while in another sample 5.40 was found. Determination of iron in the albuminate showed that it contained 2.1 per cent. While gravimetric duplicates agreed exactly, they did not represent the true percentage of Fe_2O_3, since considerable insoluble residue, not iron, was left after long treatment with hydrochloric acid.

It was noticed that as little as .05 per cent. of HCl in the cold is sufficient to begin to decompose ferratin so that a reaction for iron with KSCN can be obtained, while with the same strength acid the albuminate gave a more decided reaction.

One-half gram each of the respective iron compounds was digested for five hours at 40° C. under constant agitation with a digesting fluid made according to the United States Pharmacopœia, and which contains about one-sixteenth grain of pepsin (1–3000) to 100 C.c. of .2 per cent. HCl. At the end of the operation both the albuminates were completely dissolved into transparent, somewhat colored solutions, from which ferrous and ferric iron, as well as peptone, could be dialyzed. In each case $K_3Fe(CN)_6$ gave decided indications of both forms of iron (of course, as chlorides), but as these solutions still retained more color than the contained iron could possibly impart if all had been changed to the inorganic forms, our next task was to determine the extent of change.

At this point we were met by many difficulties. The first method which suggested itself for estimating the inorganic iron was titration with $Na_2S_2O_3$ and KI. But this method presupposes that all the iron shall be in the ferric condition, and since both forms of iron were present in the digested solutions, the use of this method was precluded because of the impractibility of oxidizing the diad iron in the presence of organic iron without affecting the latter. Precipitation as ferric hydrate was not considered practical, for various reasons. Again the solutions were too highly colored to admit of colorimetric estimation with potassium sulpho-cyanide and potassium ferri-cyanide ; besides they could determine but one form of iron.

Recalling the fact that when proteids are digested at 37° to 40° C. with .2 per cent. HCl containing a small quantity of pepsin, considerable quantities of a body are formed which Meissner termed parapeptone (Antialbumat of Kühne), as well as large amounts of hemi-albumoses, the thought struck us that possibly the high color of the digested solution was due to a compound of these substances with iron. Parapeptone is precipitated by neutralization, while hemi-albumoses are precipitated by saturation with neutral salts, as NaCl and $(NH_4)_2SO_4$. As albuminate of iron and ferratin are proteid compounds, it is but reasonable to suppose that some of these products will be formed during their digestion. Accordingly, the digested albuminate and ferratin were saturated with $(NH_4)_2SO_4$, when a copious, slightly colored, flocculent precipitate separated. This was filtered and thoroughly washed with distilled water, dried, ignited, and the iron determined both gravimetrically and volumetrically. Repeated estimations showed that in the case of the simple albuminate of iron 57 per cent., and with ferratin 63 per cent. of the iron still remained in an organic combination. The filtrate in both cases gave distinct biuret reactions for peptone, as well as tests for ferrous and ferric iron.

It is a well-known fact that the products of the action of ferments, whether organized or unorganized, hinder the further action of the ferments directly as these products increase. As the products of natural gastric digestion are largely removed by absorption, or ejection into the intestines as fast as formed, it was thought desirable to determine what change the artificial pepsin solution would produce if the products of digestion were removed. Accordingly, the washed precipitates obtained by saturating the digested albuminate and ferratin with a neutral salt, were subjected to digestion as before and the transparent solutions again precipitated. The thoroughly washed, slightly colored precipitates yielded 20 per cent. of the original iron in the case of ferratin, and 15 per cent. in the case of albuminate of iron. To be sure the extent of change occurring in the stomach must vary somewhat according to existing conditions, such as length of sojourn of the preparation, nature and quantity of gastric juice, the amount and kind of food ingested, etc. ; but all things being equal, it seems evident that the behavior of these two albuminates of iron, with acid and pepsin, vary but little.

What becomes of these undialyzable, organic, iron compounds which are present in the digested solution and which can be precipitated by neutralization and saturation? If these compounds, which are formed in nearly equal quantities with both of these albuminates, are parapeptone and hemi-albumose compounds, then it appears reasonable that they will be decomposed upon their entrance into the intestines, since parapeptone and hemi-albumoses are easily digested by alkaline trypsin. The end products of digestive action upon albuminate of iron and ferratin would then probably be peptone and inorganic iron. Whether this decomposition be complete or not, is unknown, but in all probability the extent of change would be nearly equal in both cases.

Assuming, as claimed, that ferratin resists the action of ammonium sulphide outside the body, the above experiments alone prove beyond question that ferratin would not resist the action of hydrogen sulphide after subjection to the crucial test of passing through the stomach and intestines. But we have determined that this claim is in a large measure unwarranted, since ferratin, as well as simple albuminate of iron in dry condition, immediately blackens with ammonium sulphide to such an intensity that the difference in depth of color could not be distinguished. A small portion of each compound dissolved in dilute alkali blackened at once to apparently the same depth of color. We next placed an alkaline solution containing .100 Gm. ferratin to 25 C.c. (.0054 Gm. Fe.), and an alkaline solution containing .260 Gm. albuminate of iron to 25 C.c. (.0054 Fe.) in comparing tubes and treated both under exactly the same conditions with ammonium sulphide. The solution of albuminate began to darken in five seconds, while that of ferratin did not begin to darken for twenty seconds. At the end of thirty seconds both solutions were so dark as to be opaque. By using narrower tubes and diluting the liquids equally, it was noticed that they both acquired the same depth of color at the end of two minutes. At most, ferratin resisted the action of ammonium sulphide but fifteen seconds longer than did the albuminate, and at the end of two minutes no further change could be noticed.

It is claimed that ferratin is absorbed before this action with hydrogen sulphide in the intestines can take place. If this is true, then the same must be said of albuminate of iron and inorganic forms of iron.

Admitting that ferratin is the most scientifically constructed albuminate of iron, we must not overlook the fact that it is markedly changed during its passage through the digestive tract. That such a change would take place is quite evident from the nature of the compound. It is an acid albuminate, easily decomposed by weak mineral acids, and pepsin and hydrochloric acid. No matter how constant or scientifically exact the preparation may be outside the body, we must consider it in the form in which it is presented to the absorbing surfaces.

If iron in the form of ferratin is absorbed it adds one more thread to the web of evidence, which has recently been greatly strengthed by the magnificent research of Professor McAllum, of the University of Toronto, that both organic and inorganic forms of iron are absorbed.

To recapitulate, albuminate of iron and ferratin are nearly equally altered in the stomach. Both are blackened by the addition of ammonium sulphide outside of the body, and certainly at once after the action upon them of the digestive juices. Ferratin resists the action of ammonium sulphide outside the body about fifteen seconds longer than does the albuminate.

More work will be done upon this new compound of iron, which is so interesting from a scientific point of view. From a practical therapeutic point of view, however, its advantages over other albuminates of iron are not apparent.

School of Pharmacy, University of Michigan, Ann Arbor.

There being no remarks, the following paper was then read by the author, Mr. Wm. Simpson:

THE NAMES OF MEDICINAL PLANTS OF COMMERCIAL VALUE THAT ARE GATHERED IN NORTH CAROLINA: THEIR VALUE, AND RELATIVE AMOUNT SOLD IN THIS COUNTRY AND EXPORTED.

BY WILLIAM SIMPSON, RALEIGH, N. C.

North Carolina has been facetiously termed a strip of land between two States, and if we wish to know something of its products, by reference to the geographies of the country we learn that it is celebrated for its tar, pitch and turpentine. It is with a view of bringing more prominently to the notice of the members of the American Pharmaceutical Association, the wonderful resources of North Carolina, that I have accepted the query proposed.

North Carolina, from its position in the Union, being about midway between the North and South Atlantic States, is blessed with a climate that partakes of the extremes of neither, and presents the only instance where the influence of latitude is compensated for by that of longitude. Beginning at its eastern boundary, where its shores are washed by the tempered waters of the Gulf Stream, we have the palmetto, the live oak, and the sugar cane; and proceeding westward, we attain an altitude of 6,700 feet, the highest point east of the Rocky Mountains, where we find the fir, the hemlock, the balsam, and the white pine, thus representing all the varieties of soil and climate, from Florida to Canada. Indeed, it may possibly be a matter of surprise to many of you to know that were North Carolina wheeled about so as to occupy a position directly north and south, it would extend across the States of Virginia, Pennsylvania and New York, and over Lake Ontario into Canada.

The gradual increase in elevation from east to west, secures to the State a variety of climatic influence that would be gained by twenty degrees of latitude.

North Carolina has been a favorite field with the most distinguished botanists. From Bartram, who made his tour in 1776, the elder and younger Michaux, from 1787 to 1802, down to the later botanical explorers, Dr. De Schweinitz, Nuttall, Dr. Gray, Mr. Cary who explored the higher ranges of our mountains in 1841, and our own Dr. Curtis—all agree that nowhere on the American continent are trees to be found of such beauty, value, and variety, as in North Carolina. Many of the trees and shrubs now familiar to European ornamental and economic uses, were introduced from this State; among which are the locust (Robinia pseud-acacia); the tulip tree (Liriodendron); the rose locust (Robinia hispida): the rhododendron in its various forms; the ivy (Kalmia latifoliæ), and many others, confirming what Dr. Curtis has said, that "in all the elements which render forest scenery attractive, no portion of the United States presents them in happier combination, in greater perfection, or in larger extent, than do the mountains of North Carolina;" and he might have said the same of the State at large, for no portion of it is deficient either in the number or variety of its species, or in the size and value of its trees.

In order to realize the extent to which this richness of forest development is concentrated within the area of this State, it is only necessary to call attention to the distribution of a few kinds which are dominant and characteristic. Of species found in the United States, east of the Rocky Mountains, there are Oaks 22, and 19 in N. C.; Pines 8, and 8 in N. C.; Spruces 5, and 4 in N. C.; Elms 5, and 3 in N. C.; Maples 5, and all in N. C.; 2 Walnuts, and both in N. C.; Hickories 8, and 6 in N. C.; Magnolias 7, and 7 in N. C. As to the first and most important group of the list, attention is called to the fact that there are more species of oaks in North Carolina than in all the States north of us, and only one less than in all the Southern States east of the Mississippi.

Perhaps it would not be amiss here to state that North Carolina enjoys the peculiar distinction of being the only State in the Union that fills completely every blank in the returns as sent out by the Department of Agriculture at Washington.

Of the 182 official galenical drugs of the U. S. Pharmacopœia, 94 are of foreign growth, and of the balance, indigenous to the United States, all but one are found in North Carolina.

Glancing over a price-list of one of the largest of our fluid extract manufacturers, comprising 328 varieties of drugs, foreign and domestic, I find that of the latter more than 90 per cent. are indigenous to North Carolina.

I think that I am within the bounds of truth when I say that the firm doing the largest business as herbalists in the world is in North Carolina. The amount of business done by them may be illustrated by the following extract taken from their order-book, covering one month's sales: 50,000 pounds Mandrake, 5,000 pounds Black Cohosh, 12,000 pounds Wild Cherry Bark, 8,000 pounds Red Clover Blossoms, 12,000 pounds Pennyroyal, 9,000 pounds Catnip, 8,000 pounds Stramonium leaves, 8,000 pounds Witch-hazel, 8,000 pounds Yellow Dock, 6,500 pounds Stillingia, 8,000 pounds Unicorn Root, etc.

They have taken a single order from one firm for as much as half a million pounds of drugs. Beginning in a small way some thirty years ago, this firm has gradually increased its business until they now employ more than three hundred agencies, and ship millions of pounds of drugs, consisting of more than 2,300 varieties. There are other smaller concerns in the State doing a less amount of business, confined to about one hundred varieties.

Ginseng is one of the most valued of the indigenous drugs of our State, commanding as much as $3.00 to $4.00 per pound. Therapeutically, it is of no value, except in the eyes of the Chinese, by whom it is greatly esteemed, and to whom it is all sent. Efforts to cultivate it have proved unremuneratlve, but so eager are the collectors to obtain it that it is frequently dug before the seeds are fully matured, necessitating the passage of a law by our Legislature preventing its collection before September.

Altogether, the shipment of indigenous drugs runs up into millions of pounds annually.

To my regret I have been unable to procure accurate information concerning the money value of the native drugs shipped from this State. The firms to whom I applied either could not furnish it or, for reasons best known to themselves, did not care to do so. I have therefore had to omit a reply to that part of the query, also to that part of it in regard to exports.

During the last two years of the "late unpleasantness," when the ports of the Southern States were blockaded, and medicines of all kinds were difficult, if not impossible to be obtained, resort was had to our native materia medica, and well did it stand us in stead.

The climate of North Carolina is that happy mean between heat and cold, drouth and moisture, arctic sterility and tropical exuberance, in which energies are stimulated by the bracing breath of a tempered atmosphere, cool enough to inspire physical activity, and warm enough to secure abundant returns to the tiller of the field whose labor is carried on under the happy conditions of a genial air, a friendly sun and a responsive soil.

In the sanitary department of the Census Reports it is stated that one or two of the three most healthful localities in the United States are found in the mountain regions of western North Carolina. There pulmonary consumption has never been known to originate. This feature has given the climate a celebrity for its remedial agency in such diseases, and has caused invalids to resort to the State from all parts of the Union, finding in many instances decided benefit or perfect cure.

It may be of interest to note that for spring the average temperature of the State is 57° F., for summer 77° F., for autumn 59° F., and for winter 41° F. Taking typical localities in each section as points of comparison, we find the mean annual temperature of Raleigh, in the middle section, to be 60° F., its summer temperature 76 °F., and its winter temperature 44° F., while Florence, Italy, has respectively the temperatures: 59° F., 75° F. and 44° F. In the eastern section Beaufort, on the coast, shows as the mean 62° F., 78° F. and 46° F., while Genoa, Italy, has 61° F., 75° F. and 47° F. In the mountain section, Asheville shows mean temperatures for the year 54° F., 71° F. and 38° F., which may be compared with Venice, Italy, which has 55° F., 73° F. and 38° F.

Should one not be satisfied with the conditions of temperature mentioned, and wish to avoid frost, there is within the mountains of North Carolina a thermal belt in which frost is unknown.

This frostless area is found on both sides of the mountains. The most noted of such regions is on Tryon mountain in Polk county, and so sharply defined are the lines of exemption, that it stands out a horizontal belt of verdure between areas above and below of blasted flower and foliage. Within this exempted area fruits never fail, and though at the height of 1500 to 2000 feet above sea level, frost never appears.

I am indebted for many of the foregoing statements to the Hand Book of North Carolina, published by our Agricultural Experiment Station, also to the State Board of Agriculture for its courtesy in permitting me to exhibit to the Association a collection of native drugs comprising four hundred and twenty-five varieties, which formed the exhibit of Messrs. Wallace Brothers, of Statesville, N. C., at the Columbian Exposition at Chicago, and which was afterwards donated by them to the State.

My acknowledgments are also due to Prof. Gerald McCarthy, of the Botanical Division of the North Carolina Agricultural Experiment Station, for a copy of Dr. M. A. Curtis' catalogue of the indigenous and naturalized plants of the State—a very rare book, comprising nearly five thousand species; also for a copy of Wood & McCarthy's Wilmington Flora, consisting of more than twelve hundred varieties.

I take the liberty of adding the following extract from a letter of Prof. McCarthy, which may possibly interest some member of the Association, viz.: "If any of your confreres should read a practical paper on drug farming as distinguished from mere gathering of wild spontaneous growth, I believe Director Battle would agree to try the most promising plants as experimental crops and publish the results."

My thanks are also due to Messrs. Wallace Brothers, of Statesville, N.C., and to the National Sumac and Herb Co., of Henderson, N. C., for assistance by which I am enabled to present the following partial list of native drugs handled by them:

Abies balsamea, Marshall.
“ Canadensis, Michx.
“ Noir, Poir.
Abutilon Avicennæ, Gaertn.
Acalypha Virginica, L.
Acerates viridiflora, Ell.
Acer negundo, L.
“ rubrum, L.
Achillea Ageratum, L.
“ millefolium, L.
Acorus calamus, L.
Actæa alba, Bigel.
“ spicata var rubra, Michx.
Adiantum pedatum, L.
Æsculus Pavia, L.
Agave Americana, L.
Agrimonia Eupatoria, L.
Ailanthus glandulosus, Desf.
Aletris farinosa, L.
Alisma Plantago, L.
Alliaria officinalis, Andr.
Allium Canadense, Kalm.
“ sativum, L.
Alnus rubra, Bong.
Althæa rosea, Caw.
“ alba, Caw.
Amarantus hypochondriacus, L.
“ melancholicus, L.
Ambrosia artemisiæfolia, L.
Ambrosia trifida, L.
Amaryllis Atamasco, L.
Amelanchier Canadensis, var. Botryapium, T. & G.
Amianthium muscætoxicum, Gray.
Ampelopsis quinquefolia, Michx.
Amygdalis Persica, L.
Anagallis arvensis, L.
Andromeda Mariana, L.
“ nitida, Bartr.
Anemone cylindrica, Gray.
“ nemorosa, L.
“ Virginiana, L.
Anethum graveolens, L.
Angelica atropurpurea, Hoffm.
Antennaria plantaginifolia, Gaertn.
Anthemis arvensis, L.
Anthemis nobilis, L.
Anthoxanthum odoratum, L.
Aplectrum hiemale, Nutt.
Apocynum androsæmifolium, L.
“ cannabinum, L.
Aquilegia vulgaris, L.
Arabis Canadensis, L.
Aralia nudicaulis, L.
“ quinquefolia, Gray.
“ racemosa, L.
“ spinosa, L.
“ trifolia, Gray.
Argemone Mexicana, L.
Arisæma triphyllum, Torr.
Aristolochia Serpentaria, L.
“ Sipho, L’Her.
Artemisia Abrotanum, L.
“ Absinthium, L.
“ caudata, Michx.
“ vulgaris, L.
Arum Virginicum, L.
Asarum Canadense, L.
“ Virginicum, L.
Asclepias Cornuti, Decaisne.
“ incarnata, L.
“ Syriaca, L.
“ tuberosa, L.
“ verticillata, Ell.
Ascyrum Crux Andræa, L.
Asimina triloba, Dunal.
Asparagus officinalis, L.
Aspidium Filix Fæmina, Bernh.
“ Filix Mas, Swartz.
“ marginale, Swartz.
Aster cordifolius, L.
“ Puniceus, L.
“ Tradescanti, L.
“ undulatus, L.
Azalea nudiflora, L.
“ viscosa, L.
“ calendulacea, Michx.
“ arborescens, Pursh.
Baldwinia uniflora, Ell.
Baptisia alba, R. Br.
“ leucantha, T & G.
“ tinctoria, R. B.
Barbarea vulgaris, R. Br.
Berberis Canadensis, Pursh.
Berchemia volubilis, D C.
Betula lenta, L.
“ nigra, L.
Bidens bipinnata, L.
“ connata, Muhl.
Bignonia capreolata, L.
“ radicans, L.
Blephilia hirsuta, Benth.
Blitum Bonus-Hendricus, Reichn.
Botrychium Virginicum, Swtz.
“ Lunarioides, Swtz.

Bromus secalinus, L.
Brunella vulgaris, L.
Bupleurum rotundifolium, L.
Buxus sempervirens, L.
Cacalia atriplicifolia, L.
“ reniformis, Muhl.
“ tuberosa, Nutt.
Calamintha Nepeta, Link.
Calendula officinalis, L.
Callicarpa Americana, L.
Calycanthus floridus, L.
Calystegia sepium, R. Br.
Capsella Bursa pastoris, Moench.
Capsicum (var. species).
Cardamine rhomboidea, D C.
Carpinus Americana, Michx.
Carya alba, Nutt.
“ amara, Nutt.
“ tomentosa, Nutt.
Cassia Chamæcrista, L.
“ Marilandica, L.
“ nictitans, L.
“ occidentalis, L.
Castanea pumila, Michx.
“ vesca, L.
Catalpa cordifolia, Ell.
Caulophyllum thalictroides, Mich.
Ceanothus Americanus, L.
Celastrus scandens, L.
Celtis occidentalis, L.
Centaurea Calcitrapa, L.
Cercis Canadensis, L.
Cephalanthus occidentalis, L.
Chamælirium luteum, Gray.
Chelidonium majus, L.
Chelone glabra, L.
Chenopodinm album, L.
“ anthelminticum, L.
“ Botrys, L.
Chimaphila maculata, Pursh.
Chionanthus Virginica, L.
Cicuta maculata, L.
Cimicifuga racemosa, L.
Circæa Lutetiana, L.
Cirsium arvense, Scop.
Citrus vulgaris.
Clematis crispa, L.
“ Viorna, L.
“ Virginiana, L.
Clethra alnifolia, L.
Cnicus benedictus, L.
Cochlearia Armoracia, L.
Collinsonia Canadensis, L.
Commelyna angustifolia, Michx.
Comptonia asplenifolia, Ait.
Conoclinium cœlestinum, D C.
Convallaria multiflora, L.
“ racemosa, L.
Convolvulus purpureus, L.
Corallorhiza odontorhiza, Nutt.
“ multiflora, Nutt.
Coreopsis trichosperma, Michx.
“ tripteris, L.
Coriandrum sativum, L.
Cornus circinata, L'Her.
“ Florida, L.
“ Sericea, L.
Corydalis formosa, Pursh.
Corylus Americana, Walt.
“ rostrata, Ait.
Cratægus coccinea, L.
“ oxyacantha, L.
Ctenium Americanum, Spreng.
Cucumis Lagenaria, L.
Cucurbita Citrullus, L.
“ Pepo, L.
Cunila Mariana, L.
Cuphea viscosissima, Jacq.
Cupressus thyoides, L.
Cydonia vulgaris, Pers.
Cuscuta Gronovii, Willd.
Cynoglossum Morisoni, D C.
“ officinale, L.
“ Virginicum, L.
Cypripedium pubescens, Willd.
Datura Stramonium, L.
Daucus Carota, L.
Delphinium Consolida, L.
“ exaltatum, Ait.
Dianthus Caryophyllus, L.
Diervilla trifida, Moench.
Diodia Virginiana, L.
Dionæa muscipula, Ellis.
Dioscorea villosa, L.
Diospyros Virginiana, L.
Dipsacus sylvestris, Mill.
Discopleura capillacea, D C.
Draba verna, L.
Drosera rotundifolia, L.
Echinacea purpurea, Moench.
Epigæa repens, L.
Epilobium coloratum, Muhl.
“ hirsutum, L.
Epiphegus Virginiana, Bart.

Equisetum hyemale, L.
Erechthites hieracifolia, Raf.
Erigeron Canadense, L.
  " heterophyllum, L.
  " Philadelphicum, L.
Eryngium aquaticum, L.
  " yuccæfolium, Michx.
Erythronium Americanum, Nutt.
Euonymus Americanus, L.
Eupatorium ageratoides, L.
  " aromaticum, L.
  " hyssopifolium, L.
  " perfoliatum, L.
  " purpureum, L.
  " teucrifolium, Willd.
Euphorbia corollata, L.
  " helioscopia, L.
  " hypericifolia, L.
  " maculata, L.
Fagus ferruginea, Ait.
Filago Germanica, L.
Fœniculum vulgare, Gaertn.
Fothergilla alnifolia, L.
  " Gardeni, L.
Fragaria vesca, L.
Frasera Walteri, Michx.
Fraxinus acuminata, Poir.
  " Americana, L.
  " Ornus, L.
  " pubescens, Lam.
  " quadrangulata, Michx.
  " sambucifolia, Lam.
Galax aphylla, L.
Galium Aparine, L.
  " circæzans, Michx.
  " tinctorium, L.
  " trifidum, L.
  " verum, L.
Gaultheria procumbens, L.
Gelsemium sempervirens, Ait.
Gentiana Catesbæi, Ell.
  " quinqueflora, Lam.
  " Saponaria, L.
Geranium Carolinianum, L.
  " maculatum, L.
Gerardia pedicularia, L.
  " quercifolia, Pursh.
Geum Virginianum, L.
Gillenia trifoliata, Mœnch.
Gladiolus communis, L.
Gnaphalium polycephalum, Michx.
Gonolobus hirsutus, Michx.
Goodyera pubescens, R. Br.
Gordonia Lasianthus, L.
Gossypium herbaceum, L.
Gratiola Virginiana, L.
  " officinalis, L.
Hamamelis Virginica, L.
Hedeoma pulegioides, Pers.
Hedera Helix, L.
Helenium autumnale, L.
Helianthemum Canadense, Michx.
  " corymbosum, Michx.
Helianthus annuus, L.
  " divaricatus, L.
  " tuberosus, L.
Helleborus viridis, L.
Helonias dioica, Pursh.
Hepatica acutiloba, D C.
  " triloba, Chaix.
Heracleum lanatum, Michx.
Heuchera Americana, Willd.
Hibiscus Moscheutos, L.
  " Trionum, L.
Hieracium venosum, L.
Hippuris vulgaris, L.
Humulus Lupulus, L.
Hydrangea arborescens, L.
Hydrastis Canadensis, L.
Hydrocotyle interrupta, Muhl.
Hypericum perforatum, L.
  " Sarothra, Michx.
Hypoxis erecta, L.
Hyssopus officinalis, L.
Ilex Dahoon, Walt.
  " glaber, Gray.
  " opaca, Ait.
  " verticillata, Gray.
Impatiens pallida, Nutt.
Indigofera Caroliniana, Walt.
Inula Helenium, L.
Ipomœa Nil, Roth.
  " pandurata, Meyer.
Iris cristata, Ait.
  " versicolor, L.
Jasminum officinale, L.
Jeffersonia diphylla, Pers.
Juglans cinerea, L.
  " nigra, L.
Juniperus Virginiana, L.
Kalmia angustifolia, Ait.
  " glauca, Ait.
  " latifolia, L.
Krigia Virginica, Willd.

Kuhnia eupatorioides, L.
Lachnanthes tinctoria, Ell.
Lactuca sativa, L.
" elongata, Muhl.
Lamium album, L.
Lappa officinalis Allioni, L.
Laportea Canadensis, Gaud.
Larix Americana, Michx.
Lavandula spica, D C.
Lechea major, Michx.
Leiophyllum buxifolium, Ell.
Lepidium Virginicum, L.
Leptandra Virginica, Nutt.
Lespedeza violacea, var sessiliflora, Pers.
Leucanthemum vulgare, Lam.
" parthenium, Godr.
Liatris spicata, Willd.
" squarrosa, Willd.
" odoratissima, Willd.
Ligusticum Levisticum, L.
Ligustrum vulgare, L.
Lilium tigrinum, Gawl.
Linaria vulgaris, Mill.
Lindera Benzoin, Meisner.
Linum usitatissimum, L.
" Virginianum, L.
Liquidamber styraciflua, L.
Liriodendron tulipifera, L.
Lithospermum arvense, L.
Lobelia cardinalis, L.
" inflata, L.
" spicata, Lam.
" syphilitica, L.
Lonicera Caprifolium, Ell.
" sempervirens, Ait.
Ludwigia alternifolia, L.
Lychnis Githago, Lam.
Lycoperdon solidum.
Lycopersicum esculentum, Mill,
Lycopus Europæus, L.
" Virginicus, L.
Lycopodium lucidulum, Michx.
" complanatum, L.
Lysimachia nummularia, L.
Magnolia acuminata, L.
" Fraseri, Walt.
" glauca, L.
" grandiflora.
" macrophylla, Michx.
" tripelata, Michx.
Malva rotundifolia, L.
" sylvestris, L.
Marrubium vulgare, L.
Maruta cotula, D C.
Matricaria parthenium, L.
Medeola Virginica, L.
Melampyrum Americanum, Michx.
Melia Azedarach, L.
Melilotus officinalis, L.
Menispermum Canadense, L.
Mentha arvensis, L.
" piperita, L.
" viridis, L.
Mimordica Balsamina, L.
Mitchella repens, L.
Mitella cordifolia, Lam.
Mollugo verticillata, L.
Monarda didyma, L.
" fistulosa, L.
" punctata, L.
Monotropa uniflora, L.
" Hypopitys, L.
Morus rubra, L.
Mulgedium Floridanum, D C.
Myrica cerifera, L.
Nabalus alba, Hook.
" Fraseri, D C.
Nasturtium officinale, R. Br.
Negundo aceroides, Mœnch.
Nepeta Cataria, L.
" Glechoma, Benth.
Nuphar advena, Ait.
Nymphœa odorata, Ait.
Nyssa multiflora, Wang.
" uniflora, Walt.
Ocimum Basilicum, L.
Œnothera biennis, L.
" glauca, Michx.
Oldenlandia Boscii, Chapm.
Olea Americana, L.
Onosmodium Virginianum, D C.
Opuntia vulgaris, Mill.
Orchis spectabilis, L.
Orobanche Virginianum, D C.
Origanum vulgare, L.
Orontium aquaticum, L.
Osmorrhiza longistylis, D C.
Osmunda cinnamomea, L.
" regalis, L.
Ostrya Virginica, Willd.
Oxalis Acetocella, L.
" stricta, L.
" violacea, L.
Oxydendrum arboreum, D C.

Papaver somniferum, L.
Pardanthus Chinensis, Ker.
Parietaria Pennsylvanica, Muhl.
Paris quadrifolia, L.
Parmelia caparata, Ach.
Parthenium integrifolium, L.
Passiflora incarnata, L.
Pastinaca sativa, L.
Pedicularis Canadensis, L.
Peltandra Virginica, Raf.
Pentstemon pubescens, Solander.
Petroselinum sativum, Hoffm.
Pharbitis nil, Chois.
Philadelphus coronarius, L.
Physalis viscosa, L.
Physostegia Virginiana, Benth.
Phytolacca decandra, L.
Pinus Australis, Michx.
  " strobus, L.
  " var. spec.
Pinguicula elatior, Michx.
Plantago cordata, Lam.
  " lanceolata, L.
  " major, L.
Platanus occidentalis, L.
Pluchea camphorata, D C.
  " fœtida, D C.
Polygala fastigiata, Nutt.
  " incarnata, L.
  " Nuttalii, Torr & Gray.
  " paucifolia, Willd.
  " polygama, Walt.
  " Senega, L.
Polygonum articulatum, L.
  " arifolium, L.
  " aviculare, L.
  " erectum, L.
  " Persicaria, L.
  " punctatum, Ell.
  " Virginianum, L.
Polymnia Canadensis, L.
  " Uvedalia, L.
Polypodium vulgare, L.
Polytrichum juniperum, Hedw.
Pontederia cordata, L.
Populus candicans, Ait.
  " balsamifera, L.
Populus tremuloides, Michx.
Portulacca oleracea, L.
Potentilla Canadensis, L.
Prunus serotina, Ehrh.
  " Virginiana, L.
Prunus var. spec.
Psoralea melilotoides, Michx.
Ptelia trifoliata, L.
Pteris aquilina, L.
Pterocaulon pycnostachyum, Ell.
Punica Granatum, Linn.
Pycnanthemum aristatum, Michx.
  " incanum, "
  " linifolium, Pursh.
  " montanum, Michx.
Pyrola rotundifolia, L.
Pyrus Americana, D C.
  " arbutifolia, L.
  " coronaria, L.
  " Malus, L.
Quamoclit vulgaris, Chois.
Quercus alba, L.
  " aquatica, Catesby.
  " Catesbæi, Michx.
  " falcata, Michx.
  " palustris, DuRoi.
  " Phellos, L.
  " Prinus, L.
  " rubra, L.
  " obtusiloba, Michx.
  " lyrata, Walt.
  " Castanea, Willd.
  " virens, Ait.
  " imbricaria, Michx.
  " laurifolia, Michx.
  " cinerea, Michx.
  " tinctoria, Bartr.
  " coccinea, Wang.
  " ilicifolia, Wang.
  " nigra, L.
Ranunculus acris, L.
  " abortivus, L.
  " bulbosus, L.
  " Flammula, L.
  " repens, L.
Rheum Australe, Don.
Rhododendron arborescens, Torr.
Rhododendron calendulaceum, Torr.
Rhus glabra, L.
  " radicans, Torr.
  " Toxicodendron, L.
  " venenata, D C.
Ricinus communis, L.
Robinia Pseudacacia, L.
Rosa Gallica, L.
  " rubiginosa, L.
Rubus odoratus, L.

Rubus strigosus, Michx.
" villosus, Ait.
Rudbeckia laciniata, L.
Rumex Acetosella, L.
" crispus, L.
Ruta graveolens, L.
Sabbatia angularis, Pursh.
" Elliottii, Steud.
Sabal serrulata, R. & S.
Sagina procumbens, L.
Salix alba, L.
" nigra, Marshall.
" purpurea, L.
Salsola Kali, L.
Salvia lyrata, L.
" officinalis, L.
" Sclarea, L.
" urticifolia, L.
Sambucus Canadensis, L.
Samolus valerandi, L.
Sanguinaria Canadensis, L.
Sanguisorba Canadensis, L.
Sanicula Marilandica, L.
Saponaria officinalis, L.
Sarothamnus Scoparius, Koch.
Sarracenia flava, L.
" purpurea, L.
" variolaris, Michx.
Sassafras officinalis, L.
Satureia hortensis, L.
Saururus cernuus, L.
Schrankia uncinata, Willd.
Scrophularia nodosa, L.
Scutellaria lateriflora, L.
" integrifolia, L.
Sempervivum tectorum, L.
Senecio aureus, L.
" tomentosus, Michx.
Sesamum Indicum, D C.
Sicyos angulatus, L.
Sida spinosa, L.
Silene Virginica, L.
Silphium perfoliatum, L.
Sinapis alba, L.
" arvensis, L.
" nigra, L.
Sisymbrium officinale, Scop.
Sisyrinchium Bermudianum, L.
Smilax Pseudo-China, L.
" herbacea, L.
" peduncularis, Kunth.
Solanum Carolinense, L.
Solanum Dulcamara, L.
" nigrum, L.
Solidago odora, Ait.
" rigida, L.
Sonchus oleraceus, L.
Spiræa tomentosa, L.
" opulifolia, L.
Stellaria media, Smith.
Stigmata Maidis.
Stillingia sylvatica, L.
Stylosanthes elatior, Swartz.
Symphoricarpos racemosus, Michx.
" vulgaris, L.
Symphytum officinale, L.
Symplocarpus fœtidus, Salis.
Symplocos tinctoria, L'Her.
Syringia vulgaris, L.
Tanacetum vulgare, L.
Taraxacum Dens-leonis, Desf.
Taxodium distichum, Rich.
Tephrosia spicata, T. & G.
Teucrium Canadense, L.
Thalictrum anemonoides, Michx.
" dioicum, L.
Thaspium aureum, Nutt.
" trifoliatum, Gray.
Thuja occidentalis, L.
Thymus vulgaris, L.
Tilia Americana, L.
Tradescantia Virginica, L.
Trifolium arvense, L.
" pratense, L.
" repens, L.
Trillium cernuum, L.
" erectum, L.
" sessile, L.
Triosteum perfoliatum, L.
Typha latifolia, L.
Ulmus alata, Michx.
" Americana, L.
" fulva, Michx.
Urtica dioica, L.
Ustilago Maidis, Leville.
Uvularia perfoliata, L.
Vaccinium crassifolium, Andr.
" corymbosum, L.
" macrocarpon, Ait.
" stamineum.
Veratrum viride, Ait.
Verbascum Blattaria, L.
" thapsus, L.
Verbena hastata, L.

Verbena officinalis, L.
" spuria, L.
" urticifolia, L.
Verbesina sinuata, Ell.
Veronica officinalis, L.
" peregrina, L.
" Virginica, L.
Viburnum acerifolium, L.
" dentatum, L.
" lantanoides, Michx.
" prunifolium, L.
" obovatum, Walt.
" Lentago, L.
" nudum, L.
" pubescens, Pursh.
Vicia sativa, L.
Vitis vinifera, L.
Viola cucullata, Ait.
" pedata, L.
" rostrata, Pursh.
" sagittata, Ait.
" tricolor, L.
Viscum flavescens, Pursh.
Xanthium spinosum, L.
" strumarium, L.
Xanthorrhiza Apiifolia, L'Her.
Xanthoxylum Carolinianum, Lam.
Xyris Caroliniana, Walt.
Yucca filamentosa, L.

THE CHAIRMAN: You have heard the paper, and I am very sure you all appreciate this contribution. I shall have to ask that any remarks on the paper shall come up after adjournment, or at the next session.

MR. HALLBERG: I hope not.

THE CHAIRMAN: Then we are ready for remarks.

MR. HALLBERG: I simply have a suggestion to offer; I think it was five years ago when this Association appointed a Committee to confer with the Agricultural Department at Washington for the farming of medicinal plants. Now in this paper of Mr. Simpson an offer is made that if this Association would suggest any particular medicinal plants to be experimented upon, he would be very glad to avail himself of it, and see what could be done. I would like very much to see this offer accepted. I believe that Hydrastis Canadensis is not included in his list—does it grow largely in this state?

MR. SIMPSON: Oh, yes!

MR. MAIN: I move that a Committee be appointed to consider the matter of this offer, and to suggest what plants it might be proper for us to develop in this country. I make this motion because I read an article that somewhere South a number of plants had been cultivated, and that Belladonna was cultivated in Georgia. I find there are few data on this subject, and I believe there is an important field in this direction. I hope the men who are appointed on this Committee will make out a full statement, as we ought to avail ourselves of this offer.

THE CHAIRMAN: This matter can be brought up this afternoon, after the reception of another paper bearing on the same subject.

On motion of Dr. Stewart the Section then adjourned.

THIRD SESSION—THURSDAY AFTERNOON, SEPTEMBER 6.

The Section was called to order at 4 o'clock by Dr. Whelpley, at the request of the Chairman, Mr. Sayre, who was unable to be present at the opening.

The minutes of the last session were read and approved.

Mr. Hurty offered the following resolution:

Resolved, That the officers of the Scientific Section be instructed hereafter in all printed papers to have signed thereto simply the name of the contributor.

The question being on the motion of Mr. Hurty, it was agreed to.

The Report of the Committee on the Chairman's Address was then read, as follows:

Your Committee have read the address of the Chairman with care, and find but one recommendation made, viz., that regarding the disposal of Mr. Nagelvoort's paper. Since that has already been disposed of by our Chairman in the very manner we would endorse, nothing more can be done in that direction.

We note with great satisfaction the large number of valuable and interesting papers that Prof. Sayre has succeeded in securing for this Section. He has been earnest and active in his efforts in our behalf, and his success is exceedingly gratifying to us, as no doubt it is to all the members of the Association.

We therefore tender him in behalf of the Section our sincere thanks.

W. SIMON,
LEO ELIEL.

On motion the report of the Committee was adopted.

THE CHAIRMAN: We will now proceed with the reading of the papers, and I will call on Dr. Bartley to read his paper on "A Comparison of Methods of Testing Pepsin."

DR. BARTLEY: Before I begin, I wish to state that the object of my paper is to compare the United States Pharmacopœia method with one suggested by myself some time ago, with the view of shortening the process.

The following paper was then read by the author:

EXPERIMENTS ON THE ESTIMATION OF THE PROTEOLYTIC VALUE OF PEPSIN.

Some time since, the author suggested an improvement upon the United States Pharmacopœia method of testing the digestive power of pepsin.

At that time he had not made sufficient comparative tests with this method and the United States Pharmacopœia method to state how the results of the two methods would agree. This paper is the result of a review of this question, and contains the record of experiments made for this purpose.

The improvement consists in using a solution of egg albumen instead of the solid grated albumen, made by boiling a weighed amount of egg white with nine times its weight of distilled water. The termination of the process is determined by noting the time when the albumin reaction with pure nitric acid disappears. This reaction is sharply defined, when the time is not too long, and can be easily determined. The time of digestion is therefore made the test of activity, instead of the time of solution.

The time of solution does not correspond to the time of digestion, and cannot be fixed with certainty within fifteen to twenty minutes, unless the pepsin be a very active one, and is present in such quantity as to act quickly. The albumen solution is more uniform in composition than the solid can be, unless great pains are taken. Egg-white is not of uniform composition, but that from different eggs will vary from ten to fourteen per cent. in albumin. A uniform mixture can only be obtained by grating a considerable number of eggs, and then triturating, which gives a mushy mass difficult to handle. If the whites of several eggs be mixed in the raw state a uniform average mixture is easily obtained. If now a weighed portion, say 100 grains, of this be boiled with enough water to make one liter, an almost clear, slightly alkaline solution of egg-white is produced.

Of course the egg-white must be well mixed with the water before heat is applied, and the solution must be kept in constant motion while heating. It is best to heat the mixture in a water-bath, and keep at a temperature near boiling for at least five to ten minutes. The solution will then be found to be nearly clear (opalescent). It may be strained, if necessary, but this will be unnecessary if the eggs used are fresh. A measured portion of this mixture will contain 10 per cent. of egg-white, and the egg-white so taken will contain about 12.2 per cent. of albumin. 50 C.c. of this albumen solution will contain 5 grms. of egg-white. This is the quantity of albumen taken in all of the following experiments:

Number of C.c. of Pepsin Solution used. 1 per cent. sol.	Parts of Albumen to one of Pepsin.	Volume of Liquid containing 5 grms. Egg White.	Volume of Liquid containing 50 C.c. Alb. Solution.	C.c. of dil. HCl added.	Time taken for complete Solution U.S.P.		Time of disappearance of Albumin Reaction.
1 per cent. sol.					U. S. P. H. M.	U. S. P. H. M.	Author's Method.
10 C.c.	50	100	100	2	1—40	2—0	1—50 1—50
10	50	100	150	6	....	....	2—15
10	50	....	150	6	....	....	2—15
10	50	100	....	4	2—0	2—0	
5	100	100	....	4	3—30	3—45	
10	50	50	50	2	1—50	2—0	1—45
10	50	50	50	2	2—0	2—0	1—45
10	50	50	50	2	1—45	2—0	1—50
12.5	40	50	50	2	1—30	1—30	1—15
10	50	50	50	2	1—40	1—40	1—30
7.5	66	50	50	2	1—50	1—55	1—40
5.	100	50	50	2	2—45	2—55	2—20
						3(?)	
4	125	50	50	2	2—40	4—0(?)	2—35
2.5	200	50	50	2	4—5	4—15	? ?
1	500	50	50	2	4—20	8—0	4—20
1	500	50	50	2	4—55	8—0	4—25

Tests made with three different Pepsins, A, B, C.

Number of C.c. of Pepsin Solution used. 1 per cent. sol.			Parts of Albumen to one of Pepsin.	Volume of Liquid containing 5 grms. Egg White.	Volume of Liquid containing 50 C.c. Alb. Solution.	C.c. of dil. HCl added.	Time taken for complete Solution U. S. P.	Time of disappearance of Albumen Reaction.	
							U. S. P. H. M.	U. S. P. H. M.	Author's Method.
A.	B.	C.							
10	....	..	500	50	50	1	3—55	6—0	4—10
5	....	..	1000	50	50	1	5—5 4—50	10—55 10—55	10—15 10—10
2.5	....	..	......	50	50	1	5—55		
	10	..	......	50	50	1	3—45	6—0	4—10
	5	..	......	50	50	1	4—25 4—45	7—40 6—55	6—15 6—25
	2.5	..	......	50	50	1	5—45		
		5	.....	50	50	1	3—40 3—40	4—55 4—55	6—10 6—0
		2.5	......	50	50	1	5—5	6—5	6—10

To make comparative tests the same pepsin in all of the 1st series was used. A one per cent. solution was used, from which varying amounts could be taken by measure.

The albumen solution is slightly alkaline in reaction, and on the addition of hydrochloric acid there is at first a precipitation of the albumen, or a part of it, which re-dissolves when more acid is added. A part of the acid is consumed in neutralizing the alkaline salts present, and the acidity of the solution is not represented by the amount of acid added. For this reason I have used in these experiments twice the amount of acid recommended by the United States Pharmacopœia, but the actual acidity did not exceed the maximum of stomach acidity.

Other experiments showed that the variation of acidity within these limits does not vary the results. In the case of the solid coagulated albumen, the loss of acidity is not instantaneous, but gradual, taking place as the albumen dissolves. The reaction between substances in solution is always more regular and uniform, and more rapid than between a liquid and a solid. This applies to these tests as shown in the tables. In order to secure the uniform action between the solid albumen and digestive solution, the mixture should be kept constantly agitated; but this is tedious and difficult, except by a mechanical device. The clear solution does not require shaking to secure uniformity.

Why the time of digestion should be prolonged to six hours, I am unable to understand. The average time of stomach digestion is between three and four hours instead of six. It seems reasonable, therefore, to limit the test to that time. This requires the addition of a larger amount of pepsin than the United States Pharmacopœia method calls for.

The analysis of gastric juice by Bidder and Schmidt (Ann. Chem. u. Pharm., xcii., 42) shows that it contains of organic matter, chiefly pepsin, 0.319 per cent., or one part in 3,000 of liquid instead of one in 300,000, as recommended by the United States Pharmacopœia method.

Suppose the analyses quoted show ten times too much pepsin, we should then have 1 to 30,000 instead of 1 to 300,000 of liquid.

I found by comparative tests, as shown in the table, that when the relative amounts of pepsin and albumen are such that the solution or digestion is complete in about three hours, there was a pretty close concordance. When longer, the results do not agree.

It will be noticed that the time of disappearance of the albumin reaction, in the United States Pharmacopœia method, is shortly after solution, when this takes place in less than three hours. Where the time of solution is prolonged to four hours, the time of complete digestion is very much longer. It will be noted that the results by the two methods agree better with the larger amount of acid than with the smaller amount.

It will be noticed that the time of digestion, as well as the time of solution, is not in the inverse ratio of the activity of the pepsin. There is a fair agreement between duplicate tests made by both methods, when the time is shorter than four hours.

The liquid albumen method is least troublesome, and in comparative tests of different pepsins it may be depended upon. With both methods the results are more satisfactory when the time is shortened.

THE CHAIRMAN: Gentlemen, you have heard the reading of this paper: what disposition will you make of it?

DR. ECCLES: I would like to say a word, inasmuch as the Pharmacopœia method is mentioned, and I am responsible for the United States Pharmacopœia formula. I want to give my reason why it was six hours instead of five minutes. A shorter time was suggested, but was found fault with for the reason that the conditions of the human stomach vary greatly. If Dr. Bartley will turn to the transactions of the American Pharmaceutical Association for the year that we met at Old Point Comfort, he will find there everything that he has said, the nitric acid test, as well as the solution method, and he will find five other methods given for assaying pepsin, by one of which it can be accomplished in ten minutes. The pharmacopœial standard of pepsin can be tested in five minutes, and in ten minutes you are sure whether it is pure pepsin, free from certain foreign matters; but there are some pepsins which will not comply with the test on account of the impurities in the pepsin, and wherever they occur the formula given in the Pharmacopœia will be found to be very valuable.

THE CHAIRMAN: Are there any further remarks?

MR. CASPARI: Two things were not quite clear to me and may not be to others, therefore I ask for information simply. If I followed the author correctly, I think I heard him say that if egg albumen is put into nine times its weight of water and then boiled for some time, a clear solution is obtained; that is contrary to my experience.

DR. ECCLES: A slightly opalescent solution.

MR. CASPARI: Is that a solution, or simply a suspension?

DR. BARTLEY: That seems to be a solution.

MR. CASPARI: I was not aware that it would remain so at that temperature; my experience has been that from the time you immerse the albumen in the boiling water it begins to thicken, and will all coagulate. In using it as a clarifying agent we observe the same changes.

DR. ECCLES: If you have a large quantity, it will.

MR. CASPARI: Is it a solution; I think not.

DR. ECCLES: It is partly a solution and partly a suspension. It is altered in its nature. The objection made to that process was a just one; that it was not albumen in the normal state.

MR. CASPARI: Another point is the temperature at which the author has allowed the digestion to go on.

DR. BARTLEY: Ordinarily between 35 and 40 degrees Centigrade.

DR. ECCLES: The trouble is that in using ordinary egg albumen it is so difficult to get any of that albumen to go into a solution in the absence of pepsin, that the fact that it ever went into a solution at all was discredited; at the Old Point Comfort meeting we were met with that also; but, on the contrary, this form can be readily turned into a transparent mixture by heating with hydrochloric acid.

THE CHAIRMAN: Does any one else desire to speak on this paper?

MR. LLOYD: I would like to ask if this mixture of one part of egg albumen and nine parts of water, then boiled and allowed to stand for 6, 8 or 10 hours, will not separate. Some of these precipitates I have found so nearly transparent, they seem to be in solution until allowed a certain length of time, and allowed to separate from the rest; I am rather of the opinion that they will be found to separate.

DR. BARTLEY: There is a slight separation, although not a complete one, on standing over night, but the albumen seems to remain in solution. I am inclined to think it is a solution, because if you filter, your filtrate is nearly transparent, and you get a very decided albumen reaction; but while I am on my feet, I wish to state the point of the paper I meant to limit the discussion to when I opened, by saying that the object of the paper was merely a comparison of these two methods. There are lots of points to discuss, but I wished to limit it to this one idea. In regard to Prof. Caspari's question, this point of the acid solution of egg albumen is not a new one. I think Roberts first called attention to it in his book on digestive ferments; that is the place where I first learned it.

THE CHAIRMAN: If there are no further remarks the paper will take its regular course, and we will proceed to the reading of a paper by Dr. Eccles, entitled "Pharmaceutical Bacteriology."

DR. ECCLES: This is a paper I have written since I left home on the way, and it does not embody any experimental work, and only refers to work already done, for the purpose of enlightening some of the pharmacists who do not get time to become acquainted with current literature. That is my object in presenting the paper, otherwise it would be out of place here.

PHARMACEUTICAL BACTERIOLOGY.

BY ROBERT G. ECCLES, PH. G., M. D.

The impression prevails that medical men alone should interest themselves in bacteria. It is assumed that the subject contains nothing of interest to pharmacists. It requires no prophet to foresee that this attitude is not likely to be maintained very much longer. The indications are that

Pharmaceutical Bacteriological Laboratories are a certainty of the future, and that they may exceed in vastness and importance those now conducted by the medical profession. As yet we have only hints of what is in store for us. Here and there a rift in the cloud that obscures the future from our vision lets through an illuminating beam of light.

It is said in Holy Writ that "that which hath been is now, and that which is to be hath already been." In the vast laboratory of nature, long before man had synthetized a single remedy or combined, *secundum artem*, a single pair of synergistic remedies, plants had done the same, yes, and more. It can now be maintained with a formidable array of evidence that the aim of such combination was precisely that of the pharmacist and physician when a remedy is compounded for a patient. In both cases the overcoming of pathological disease-germs was the ultimate result and object aimed at, if there was any aim. The resins, the essential oils, the tannins, the alkaloids, the glucosides, the bitter principles, are all so many bacteria killers or inhibitors devised by plants or produced by the direct action of bacteria themselves, that in the economy of nature serve to give immunity to plants against the ravages of other organisms. As if quinine was not enough to shield the cinchonas from malarial and kindred germs, we find them further protected by quinidine, cinchonidine, cinchonine and other synergists. With morphine are combined codeine, narceine and a host of other alkaloids having analagous effects. The life history of these plants casts a flood of light on this subject, and if we had anything like a perfect geological history of any genus, there can be but little doubt that it would fully confirm all we are able to infer from the immediate data at our command. In the cinchonas we have more material on which to base an inference in this respect than in any other. Their habitat is a region of perpetual fog and drizzle. For months a ray of sunshine scarcely if ever reaches them. The region is utterly unfit for human habitation, and intermittent and remittent fevers are the penalty paid for a temporary residence near them.

Now the fact so thoroughly established that plants are as frequently the victims of the parasitism of micro-organisms as are animals, placed beside the fact that their home is such an ideal one for micro-organisms, would naturally lead one to think that if these trees owe their immunity to some chemical secreted by them, we should be able to discover it. Now let us add the further fact that quinine and these other alkaloids they secrete are powerful antiseptics and do destroy just such germs, either out of or within the body, and the conviction begins to grow upon us that something like a purpose is manifested in this arrangement. But on reasoning farther we learn more. These alkaloids are always found in the very part of the plant where the attack of germs would be most likely to occur, and when occurring would prove most injurious to the tree. Why is there not a good supply of these alkaloids in the wood or in the corky layer of the bark? Why are they in the very part of the bark where *a priori* we would expect them to do most good? Now let us add another fact. The yield of these alkaloids is always greatest, the greater the danger from such bacterial invasion. The season of maximum fog and drizzle is the season of maximum yield of alkaloids, and especially of quinine, the most powerful one. What is quite remarkable, too, in this connection, is the fact that the cinchona tree seems to have the power of anticipating the bacterial invasion by the very method that we would be likely to use in anticipating it. The increase of alkaloids evidently occurs prior to the invasion of the germs and following the advent of the conditions that make their invasion possible. The cutting off of their sunshine by fog is their signal for the production of an increased supply of alkaloids and especially of quinine. In India, where cinchonas are now cultivated and where fogs are not so common, they cover the bark of the trees with cotton and shield them from direct sunlight to increase their production.

The dark, warm and damp forests where heavy growths of pine abound would surely prove miasmatic but for the good office of the pines themselves. They load the air with germ-destroying terpenes, the oxidation of which gives forth a rich supply of ozone. These vestiges of the primitive world tell us of their struggle against disease germs and survival by virtue of this protection.

It seems a rather singular fact that when plants or animals do not produce destructive agents by which to vanquish bacteria they are sure sooner or later to bring into existence a product destructive to themselves. When we pause to think that "the mill cannot grind with the water that is past," nor the fire burn with the carbon dioxide produced, we see it is a universal fact in nature. The germ that runs sugar down into alcohol soon perishes in that alcohol. Following it comes the vinegar germ, giving us acetic acid in sufficient abundance to stop its own activity. Next follow one by one other germs to carry the changes farther and farther down the hill, till in every instance they work their own destruction or at least cessation of activity. Each of these products final to some definite species of germ is an antiseptic to that germ, and therefore a medicinal agent for the subjugation of that germ when it becomes pathogenetic.

It took us a long time to learn that all our alcohol, wines and liquors are the products of germs. Even when "mother of vinegar" was handed from house to house and manufacturer to manufacturer, they did not for centuries suspect that they were handling germs. Many druggists do not yet know that ergot is the product of a disease germ. It is only lately that we have discovered that we owe our nitric acid, saltpetre, sweet spirit of nitre, and all our nitrates and nitrites, to the useful labors of humble bacteria. Much of our ammonia, some of our benzoic, hippuric and butyric acid, we owe to their kind offices. As our knowledge of micro-organisms widens, our respect for their pharmaceutical and chemical skill increases.

Within a year Dr. Carl Wehmer has reported the fact that he has isolated a species that converts sugar into citric acid so that 11 pounds of sugar will produce 6 pounds of the crystallized acid. The cost of such conversion is so trifling that it is scarcely worth considering. A discovery like this will work little short of a revolution. Sugar is cheap and the acid is bound soon to be sold for little, if any, more than the price of the cheapest sugar. Of course, we will have to wait till the patents run out for such a consummation.

When we pause to consider the fact that in the plant world the cells build up the countless numbers of organic compounds from simple carbonic acid, water and nitrogen compounds, and when we further consider that the bacteria are isolated cells, capable of duplicating much of, or all such work, we can gain some idea of the possibilities that lie before us. We have to supply them with the raw material for their food, and without money and without price they will do the rest. We only need to isolate the special kinds, in relatively pure cultures, and set them to work. When mixed, one kind undoes the work of another, so that no useful results occur. Prof. Conn, of Wesleyan University, has lately isolated the special bacterium that produces the essential ether to which is due the rich flavor of our highest quality of butter. Following his directions, the butter-maker can now at will produce a ripened cream, possessing the highest, richest aroma of prime butter.

If we have successfully produced one such product, who can say where the end is? The highly prized aromas of wines and liquors, the rich flavors of fruits and flowers, may all be within our power to produce in the same manner. If we can call these pigmy workers to our aid in making alcohol, acetic and citric acid, why not other acids, other alcohols and other organic compounds? We have found that through the magic of their power certain leguminous plants are able to draw from the atmospheric nitrogen their necessary supplies of that refractory gas. May we not utilize their services in a similar manner? Will not the pharmaceutical chemists of the future supply these same bacteria with what the leguminous plants provide them, and on a vast scale procure our nitrates, nitrites, ammonia and ammonium compounds, at the same time giving to the farmers all they need to enrich the soil of their farms? All the rich mines of Golconda never contained such wealth as is promised in this direction. Man first learned of the winds as his foes, but soon he harnessed them and they became his friends. At a later date he gained power over fire, and in the conquest found he had a mighty agent to do his bidding. Still later and the lightning that he so long dreaded as the bolt of heaven, came within his grasp, and we are beginning to realize the majesty of such a victory. Now he has just begun his conquest of the most direct foe he has ever had to fight—the microbes—and if our vision is not distorted he will find here a power second to none of the rest in the benefits it can bestow upon him.

MR. PAYNE: I would like to ask Dr. Eccles one question as to that paper, for information. He says that all nitric acid is produced by bacteria. Does he mean the nitric acid also which we consider to be produced by electricity, or the electrical discharges through the atmosphere?

DR. ECCLES: The quantity produced in that way is trifling; that would be different: I refer to that produced by the plants. The plants utilize the bacteria, and there are certain plants that have been experimented with. There is one special class of bacteria which produces the nitrates, and another the nitrites.

MR. PAYNE: The reason I asked is because I hope to produce nitric acid from ammonia without the agency of microbes. There are a number of chemists who assert that it has been produced without their intervention. If we could do that, it would be a wonderful thing.

MR. SIMON: We know that in the manufacture of tobacco the cultivator or manufacturer causes the tobacco leaves to undergo fermentation. Now lately very successful attempts have been made to isolate the bacteria from Havana tobacco, and by transferring them to lower grades of tobacco, cause them to induce the same kind of fermentation in these lower grades. The results have been most satisfactory, and in the future we can hope that the United States will produce as excellent a quality of cigars as we now obtain from Cuba.

MR. PAYNE: I am only asking the question for personal information. Have you any knowledge whether the isolation of the bacilli of malarial fever so they can be identified beyond question after the inocnlation of some person or creature with it is a positive fact?

DR. ECCLES: A number of bacilli have been isolated, and have been concluded to be those of malarial fever; I do not know whether they have been positively identified as such.

MR. PAYNE: I knew a chemist, some twenty years ago, who claimed that he had the evidence necessary to prove, when a party was killed, that the blood was that of a man suffering from malarial fever, and that it was proven afterwards that the man was suffering from malarial fever. I had that question brought up by some physicians a few weeks ago, and I was asked about identifying such a germ for them. I told him I would not say I could, that I would see what I could do with a microscrope. Several germs of different kinds have been claimed as being the cause of cholera.

THE CHAIRMAN: Are there any further remarks?

MR. ALPERS: I read the other day in a report that in one district they were overrun with mice, and they caught some of the mice and inoculated them and in a short time the mice were all killed by typhoid fever.

DR. ECCLES: I should think that would be rather a dangerous experiment.

MR. SIMON: Oh, no! The bacterium is a very different one; it is special; it is one which is characteristic of the mice, and this was wonderfully successful.

MR. ALPERS: I think the idea of inoculating the tribe of New Jersey mosquitoes with it might be a good one. (Laughter.)

DR. ECCLES: I would like to add that if Mr. Alpers succeeds in doing that he will succeed in getting rid of the malaria in New Jersey, and that would be a good plan; the movement from place to place and the direction of the wind indicate that the mosquito is the scavenger.

MR. PAYNE: I must enter a disclaimer against inoculating mosquitoes with the germs of typhoid fever.

THE CHAIRMAN: Are there any further remarks? We are somewhat wandering, chasing the elusive bacteria.

MR. KRAEMER: As I understood Dr. Eccles, I think he referred to the plan of utilizing the plant in warding off these disease germs.

DR. ECCLES: With many of them; yes.

MR. KRAEMER: On what do you base your inference?—because it is purely an inference.

DR. ECCLES: All induction is inferential, and we have no knowledge except inductive knowledge which is worth one cent; and when you say pure inference you are saying what is true; there are very few truths arising outside of induction. It is certainly an inference; I acknowledge it with pleasure.

MR. KRAEMER: There are no facts.

DR. ECCLES: There are facts; if there were no facts, we could not make the inference.

MR. KRAEMER: What are these facts?

DR. ECCLES: I state these in the paper; as to singling them out from these facts, that is inference.

MR. KRAEMER: I would like to call attention to the fact, I think that points to the alkaloids, and must be the principle for that purpose, because they are produced in the bark. Did you not say that?

DR. ECCLES: No! In deduction we always have a large number of facts; our theory makes these facts come together as a solid fact. We do not depend on any one fact—that would be fallacy; it is the process that gathers all these together.

MR. KRAEMER: I fail to see this.

DR. ECCLES: That is very likely, although you may change your mind.

MR. GOOD: I have the same idea brought out by Mr. Kraemer.

THE CHAIRMAN: We will now listen to Prof. Caspari, who desires to exhibit a new suppository mould to the Association.

MR. CASPARI: I will have to make an apology for presenting what may appear to be a somewhat imperfect instrument, which was sent to me at the very last moment, and I have had no opportunity to have the defect remedied. The manufacturer made a mistake in the position of the bar, which necessitates a very inconvenient feeding of the machine; this difficulty will be obviated in all subsequent machines. I have operated this one, and thought it was perhaps better to exhibit this apparatus than none at all, so that when you read a description of it in the journals, you may have a better idea of what the instrument looks like. This is a mould which is unique in its arrangement, inasmuch as the suppository can be formed in a paper capsule, and then taken out of the mould, and placed on ice, if desired, in warm weather, without being brought into direct contact with the fingers. The compression is effected within the paper capsule in a peculiar manner, entirely different from other suppository compression moulds. The feed tube is pushed into the mould holding the paper capsule, clear to the end; by then firmly holding the mould with one hand and forcing the material from the barrel by turning the wheel with the other hand, a shell is first formed in the paper capsule around the tube, which is then filled solidly in the centre. The machine is provided with three sets of moulds, for 15, 30 and 50 grain suppositories of the "Wellcome shape," exhibited last year at Chicago. It is known as the "Genese" suppository mould, and is made in Baltimore.

Dr. Dohme then read the following paper:

ADDITIONAL EXPERIMENTS WITH DATURA STRAMONIUM.

BY ALFRED R. L. DOHME, PH. D.

During the course of last summer and autumn the writer performed some experiments with several narcotic herbs,[1] the object being to ascertain which part of the plant contained the most alkaloid. Due to the difficulty of getting fresh parts of the plants Atropa Belladonna and Hyoscyamus Niger, the scope of the experiments was limited to the indigenous Datura Stramonium. The leaves, stems and roots of the latter then used were gathered in July and August, and they were assayed both in the fresh and dried state and by the methods of Lyons[2] and Dragendorff,[3] the latter modified so as to be used as a gravimetric process to which subsequent titration could be applied. The result was that fresh parts of the plant in general were found to contain more alkaloid than dry parts; also that Dragendorff's process yielded better results than Lyons' process for this plant; and, finally, that the stems contained by far the most alkaloid, the seeds next, then the leaves, and the roots least of all. Below are appended the figures obtained:

Part of plant used................	Leaves (a)	Leaves (b)	Leaves (c).....	Leaves, *green* (c)	Stems (a)	Stems (b)	Stems (c)	Stems, *green* (c)	Roots (a)	Roots (b)	Seeds (a).	Seeds (b).
Gravimetric percentage	0.654	0.554	1.420	1.420	0.770	1.060	0.931	1.000	0.496	0.790	0.556	0.596
Volumetric percentage by titration.	0.214	0.231	0.231	0.271	0.306	0.358	0.439	0.467	0.138	0.173	0.248	0.289

Where (a) represents determinations made by Lyons' method, (b) those by Dragendorff's method, both (a) and (b) being taken from plants gathered in July, while (c) represents those made by Dragendorff's method of plants gathered in August, and "green (c)," the latter, in the green or fresh state. In order to make direct comparisons with the dried drug, in those cases where the fresh or green drug was used, the moisture was determined in a separate sample of the same. By this means the alkaloidal value of the fresh plant could be directly compared to that of the dried leaves and stems.

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[1] The Relative Alkaloidal Value of the Various Parts of the Plant Datura Stramonium. Amer. Journal Pharmacy, Oct., 1893.

[2] Lyons, Manual Pharm. Assaying, § 29, page 20.

[3] Dragendorff, Manual Pharm. Assaying, § 91, page 48.

The above facts were surprising and unexpected. It was, hence, for the double purpose of verifying them and comparing with them the alkaloidal contents of June-grown Datura stramonium that the following experiments were taken up. Only the leaves and stems were taken, and they were examined only in the dried state, having been carefully dried in the air without heat. Two methods were again employed, but instead of Lyons', Keller's method was used in order to test its applicability to this drug and compare it with Dragendorff's modified method. The results obtained verified those obtained last year, and indicate unquestionably that the stems of Datura stramonium contain more alkaloid than the leaves. The figures follow:

Part of plant used..................	Stems.	Stems.	Leaves.	Leaves.
Percentage of alkaloids by titration with volumetric acid solution.......	0.175	0.120	0.139	0.085
Method used	Keller's.	Dragendorff's.	Keller's.	Dragendorff's.

The experiments by both methods were made with the same lot of drug, which was gathered near Baltimore during the month of June.

The conclusions to be drawn are:

1. That the stems of Datura stramonium contain more alkaloid than the leaves.

2. That the plant Datura stramonium gathered in June contains less alkaloid than that gathered in July and August.

3. That Keller's method extracts more alkaloid from the drug Datura stramonium than Dragendorff's method does.

Baltimore, July 17th, 1894.

DR. ECCLES: I would like to ask Dr. Dohme whether in any of these experiments he saw the plants gathered, and whether he is sure that it is stramonium, and not a mixture? I find that those who gather the plants do not discriminate. I have seen it gathered, and have found they gathered very little stramonium and a great deal of the other plant (tatula). I am glad to see that the experiment has been so thoroughly tried.

DR. DOHME: I did not see it gathered; it was obtained from a gatherer, and was freshly gathered, although dry when used.

DR. ECCLES: In this particular neighborhood there is said to grow far more tatula than stramonium; in the west there is more stramonium; I doubt if the ordinary gatherer can tell the one from the other.

MR. LLOYD: I would like to ask you, do you understand that the Datura stramonium gathered in June contains less alkaloid than that gathered in July or August? Admitting that that fact is true, I understand that the samples this year were gathered in June, and last year in July and August. I would like to see an experiment made with it gathered at the same time as last year. A great deal was gathered last year in July and August. The point I wish to call attention to is, Does the season have an influence upon the drug? I think that Dr. Dohme will find the plant produces a certain amount of alkaloid in June, and when gathered in July or August next year the result may be quite different; then again, the year following, when gathered in the same months, it will be different again, depending altogether upon the weather, whether it is favorable or not to the growth of the plant. I make these remarks because I think the plant may be gathered too soon when gathered in June, and a month latter the selection would be better.

Dr. Dohme then read a paper entitled "The Relative Value of two kinds of Ipecac Root."

THE RELATIVE ALKALOIDAL VALUE OF TWO KINDS OF IPECAC ROOT.

BY ALFRED R. L. DOHME, PH. D.

About a year ago the writer reported upon some experiments with Ipecac Root made to determine the comparative value of the various forms of the latter met with in commerce. It was then shown that the thick annulated root commonly called "Fancy Root" did not always contain the most alkaloid, and hence was not always the most valuable. It was shown that the thin smooth root commonly termed "Wiry Root," contained more alkaloid than this, and by a combination of analytical and microscopical examination an explanation of this was attempted. It was shown that the central woody portion contained little or no alkaloid, and that this was to be found mainly in the cortical envelope, and mainly concentrated in the cork layers and cortical parenchyma adjacent to the latter. It was also pointed out that the microscopical examination of the cross-section of ipecac root showed that the colored portions of the root were to be found in the cork layers and cortical parenchyma cells adjacent to them, and that these portions resembled in color the residues from the final extract obtained in assaying the drug and which were weighed as alkaloid in gravimetric determinations. The color is the same as that of ipecacuanhic acid with which the alkaloids are combined in the drug and hence serves to locate them. The thin smooth root above referred to was shown to Prof. Flückiger while he was in Baltimore and pronounced by him to be rather a stem than a root, and most probably that part of the root near the surface of the ground which merges the root into the stem. It shall as before be termed "Wiry Root" in this article. The following results were then found and reported:

"Fancy" A yielded 1.36 per cent. of alkaloids by titration with volumetric acid solution.

"Fancy" B yielded 1.29 per cent. of alkaloids by titration with volumetric acid solution.

"Fancy" C yielded 1.36 per cent. of alkaloids by titration with volumetric acid solution.

"Fancy" D yielded 1.44 per cent. of alkaloids by titration with volumetric acid solution.

"Wiry" A yielded 2.03 per cent. of alkaloids by titration with volumetric acid solution.

"Wiry" B yielded 1.88 per cent. of alkaloids by titration with volumetric acid solution.

"Wiry" C yielded 1.69 per cent. of alkaloids by titration with volumetric acid solution.

"Woody Portion" A yielded 0.56 per cent. of alkaloids by titration with volumetric acid solution.

"Woody Portion" B yielded 0.55 per cent. of alkaloids by titration with volumetric acid solution.

"Woody Portion" D yielded 0.44 per cent. of alkaloids by titration with volumetric acid solution.

"Wiry scrapings" A yielded 2.18 per cent. of alkaloids by titration with volumetric acid solution.

"Wiry Scrapings" B yielded 2.17 per cent. of alkaloids by titration with volumetric acid solution; where A, B, C and D are separate and distinct samples of Ipecac Root, each, however, containing both "fancy" and "wiry" root.

In order to more directly compare the various parts of the two kinds of roots above described, the cortical envelope, above called "Wiry Scrapings," was removed from the central woody cylinder, above called "Woody Portion," and each assayed separately. The cortex was in each case scraped from the woody central cylinder by means of a knife and the woody cylinders closely examined so as to be certain that no particles of cortex still adhered to them. All were then ground to a No. 80 powder and assayed. The method of Mr. C. C. Keller, of Zurich, was used instead of Lyons' method which had been used last year. This was done for two reasons: first, because it gave better results, and second, because it was found to be more expeditious. The method of Keller is quite simple and is being applied by its author to all alkaloidal drugs. It consists in treating the drug directly with ether and chloroform, usually three parts of ether to one of chloroform by weight, shaking well for five minutes, then adding sufficient ammonia water and shaking well for half an hour. Then some water is added to clog the drug powder together and an aliquot part is poured off and at once treated with dilute acid in a separatory funnel. The acid solution is made alkaline with ammonia and extracted with ether-chloroform, the chloroform usually in excess to facilitate separation. The extracting fluid is let into a small flask and the ether-chloroform distilled off on a water-bath. By adding a little ether and alcohol, the last portions of chloroform can be successfully removed on the water bath. The residue, consisting of the alkaloids usually in a good state of purity, is then titrated with acid and alkali, using brazil wood or cochineal as an indicator. The following results were obtained:

Cortex of "fancy" root yielded 1.68 per cent. of alkaloids by titration.

Cortex of "wiry" root yielded 3.15 per cent. of alkaloids by titration.

Woody portion of "fancy" root yielded 0.17 per cent. of alkaloids by titration.

Woody portion of "wiry" root yielded 0.50 per cent. of alkaloids by titration.

These roots were picked from the same sample of ipecac root, which contained both varieties in about equal quantity.

This verifies the results obtained last year and justifies the conclusion that the so-called "wiry" root, *i. e.*, the upper part of the root which frequently is in part a stem, contains more alkaloid than the lower or annulated part. The explanation of this fact is easily given. The cork cells and cortical parenchyma adjacent to them are the seat of the alkaloids. A piece of "fancy" root weighs more than a piece of "wiry" root of the same size, because of the excess of starch in the former. It hence takes three pieces of the same length of "wiry" root to make up the same weight as two pieces of "fancy" root. The percentage of outer bark *i. e.*, cork cells and adjoining cortical parenchyma is in consequence greater in case of the "wiry" than in case of the "fancy" root, which is only another way of saying that the percentage of alkaloids is greater in the former than in the latter. This also explains why so much more alkaloid was found in the comparative cortex assays in the "wiry" than in the "fancy" root; for given the same weight of both, there was more wood removed when the cortex was scraped from the woody cylinder in case of the "wiry" than in case of the "fancy" root, and it required all the more of the "wiry" cortex to make up this loss, since the percentage of wood in the "wiry" is about three times that in the "fancy" root. This is equivalent to an addition of alkaloid, since the cortex is the seat of the latter.

Baltimore, July 18th, 1894.

THE CHAIRMAN: Are there any remarks?

MR. CASPARI: This paper simply goes to show, Mr. Chairman, that it is not always best to buy that which commands a fancy price in the market. Here we have evidence of a root commanding in the market a high price being of less value than a commercially inferior grade, and that the determination of the value must depend upon their alkaloidal percentage.

DR. DOHME: I would say in regard to the ipecac root that comes into the market in various forms under different commercial names that the true or "fancy" root is made up of the part that is found below the ground, while the so-called "wiry" root is both stem and root, and is made up of the part at the surface and above the ground; the "wiry" root is the cheaper, the "fancy" root being sometimes twice as high. Then there are intermediate grades, depending upon the relative amount of the two kinds present. As my results show this value is based upon a false assumption, for the "wiry" root ought to be the most expensive, and the "fancy" root ought to be the cheapest.

THE CHAIRMAN: Are there any further remarks? If not, we will listen to a paper on a subject which closely concerns all of us, "The Official Process for Spirit of Nitrous Ether."

The following paper was then read by the author:

THE OFFICIAL PROCESS FOR SPIRIT OF NITROUS ETHER.

BY CHAS. M. FORD, DENVER.

The present official process for making spirit of nitrous ether, is as follows:

	Gm.
"Sodium nitrite, seven hundred and seventy grammes	770
Sulphuric acid, five hundred and twenty grammes	520
Sodium carbonate, ten grammes	10
Potassium carbonate, completely deprived of water by drying, thirty grammes	30
Deodorized alcohol,	
Water, each a sufficient quantity.	

"Dissolve the sodium nitrite in one thousand (1,000) cubic centimetres of water, and put the solution into a suitable flask, connected with the condenser kept cold with ice-cold water; then add five hundred and fifty (550) cubic centimetres of deodorized alcohol and mix well. Through a cork fitted into the mouth of the flask insert a funnel-tube dipping below the surface of the liquid. With the condenser connect a receiver and keep this surrounded by a mixture of common salt and crushed ice. Then gradually introduce through the funnel-tube the sulphuric acid, previously diluted with one thousand (1000) cubic centimetres of water. Distillation will usually commence before the whole of the acid has been added. When all the acid has been introduced, regulate the distillation by the application or withdrawal of a gentle heat until no more nitrous ether distills over. Wash the distillate, first, with one hundred (100) cubic centimetres of ice-cold water to remove any alcohol which may have passed over, and then remove any traces of acid by washing the ether with one hundred (100) cubic centimetres of ice-cold water, in which the sodium carbonate had previously been dissolved. Carefully separate the ether from the aqueous liquid and agitate it, in a well-stoppered bottle with the potassium carbonate, to remove traces of water. Then filter it through a pellet of cotton, in a covered funnel, into a tared bottle containing two thousand (2,000) cubic centimetres of deodorized alcohol. Ascertain the weight of the nitrous ether filtered into the alcohol by noting the increase of the weight of the tared bottle and its contents, and then add enough alcohol to make the mixture weigh twenty-two (22) times the weight of the nitrous ether added. Lastly, transfer the product to small amber-colored, well-stoppered vials and keep them in a cool place, remote from lights or fire."

Shortly after receiving the Pharmacopæia of 1893 a trial was made of the above process for making spirit of nitrous ether. Having in mind the many objections to the former process, as well as to any process that requires the use of nitric acid for furnishing the necessary N_2O_3, the new official method met with immediate favor in advance of any trial. It seemed calculated to yield us a definite product, a simple solution of ethyl nitrite, and to put an end to the vast speculation heretofore indulged in as to which particular impurity always present in sweet spirit of nitre its efficacy was due. This doubt as to the composition of the article which is supplied the public under a definite official name has long been annoying and humiliating to pharmacists. It is on a par with the practice of some physicians prescribing proprietary compounds the composition of which is a secret, or is dependent on the caprice or conscience of a single manufacturer.

The United States Pharmacopœia formula would yield, if all the sodium nitrite were converted into ethyl nitrite, about 837 grams of the ether. One-fifth of the quantity was deemed sufficient for the experiment as well as for the immediate needs of the shop, and the material for such a batch was accordingly prepared. The sodium nitrite could not be dissolved in the prescribed quantity of water at winter temperature. A slight alteration of the formula was then made, viz.: the water was warmed and quantity increased just sufficiently to effect a solution of the salt. The addition of the alcohol then to the solution in the retort caused some precipitation of the salt in a fine state of division. This it was thought might have been contemplated by the author of the formula. The apparatus employed was just the same as had been successfully employed on former occasions for making nitrous ether by other methods.

A half-gallon retort with a thistle tube passing below the surface of the liquid; retort connected with a 30-inch Liebig's condenser and this with a capacious receiver surrounded by crushed ice, all joints securely fitted and covered with luting. Except for the omission of the common salt, which should have been mixed with the crushed ice about the receiver, and the trifling but unavoidable alteration above noted, the instructions of the Pharmacopœia were carried out to the letter. Everything was now ready for the first addition of the sulphuric acid mixture, which was just at this time made, so that the heat generated might be available for the chemical action in the retort. A small quantity of broken glass had also innocently been added to facilitate the liberation of the ether bubbles. Those who know better than to follow closely the official process for this preparation will readily appreciate the discomfiture of an inexperienced operator like the writer. The first small addition of the acid mixture through the thistle tube was followed by a very violent reaction. A second addition was more so. Thinking that some of the official directions might have been overlooked, a careful re-study of the formula was made. No reference could be found anywhere to temperature, any more than that the use of heat would be necessary in the operation. It was evident that the authors expected that the directions for carrying out this process would be supplied by the high-grade pharmacist who would attempt it. After cooling the mixture in the retort by filling the bath surrounding it with cold water and placing the vessel containing the sulphuric acid mixture under a stream of water till reduced to a temperature of 13° C., the operation was resumed. Cloths wrung out in ice-water were laid upon the retort and about the condenser. It was thought that a liberal use might now be made of the sulphuric acid mixture. Such was not the case. The smallest quantities added were followed by the instantaneous production of all the ether capable of being produced. Condensation of such vapor produced at a low temperature is difficult in a distilling apparatus. The distillate after washing with the sodium carbonate solution was weighed in a tared separator and weighed 27 grams, about 14 per cent. of the theoretical yield, as calculated from the quantity of sodium nitrite used.

A further study of the official formula revealed the fact that the quantities employed bore an indifferent relation to the theoretical quantities. The equation showing the reaction is as follows:

$$2(\mathrm{Na.NO_2}) + \mathrm{H_2SO_4} + 2(\mathrm{C_2H_5HO}) = 2(\mathrm{C_2H_5NO_2}) + \mathrm{Na_2SO_4} + 2\mathrm{H_2O}.$$

98 grams of $\mathrm{H_2SO_4}$ = 105.8 grams of the U. S. P. Acid.

92 grams of $\mathrm{C_2H_5HO}$ = 100 grams of Alcohol Deod., sp. gr. .816.

The comparison is shown thus:

	$\mathrm{NaNO_2}$	$\mathrm{H_2SO_4}$ U. S. P.	Alcohol sp. gr. .816.
Theoretical formula	138	105.8	100
Theoretical formula	770	591	558
U. S. P. formula	770	520	448 (550 C. c.)

In its description of the sodium nitrite, the Pharmacopœia admits 2.4 per cent. impurity. In the Denver market the only article obtainable is one of absolute purity. Even allowing for the use of the impure article, which may be furnished to the trade in some sections, and reducing the quantities of sulphuric acid and alcohol to correspond to such an article, the official quantities should be as follows:

Sodium nitrite	770 grams.
Sulphuric acid	577 grams.
Alcohol, sp. gr. .816	545 grams.

It is evident there are a number of errors and omissions in the official formula which are difficult to account for except upon the grounds of carelessness. The error in the quantity of alcohol used in the reaction may be due to the fact that 550 C.c. were named instead of 550 grams: because it is not likely that a quantity of alcohol for a chemical reaction would be named by measure. It is expected to furnish a definite weight of the ethyl radical. The volume of a liquid is far from being constant, whereas the weight invariably is. To make a mistake of using measure instead of weight for a light liquid like deodorized alcohol makes a deficit of 184 C.c. for each 816 C.c. employed. Since 448 grams of alcohol can engage only 618 grams of sodium nitrite and 473 grams of sulphuric acid, U. S. P., there is obviously a waste of 152 grams of the expensive nitrite and 47 grams of the acid.

Based upon the foregoing observations, the following formula was constructed, the same apparatus being used as in the previous operation:

Sodium nitrite	136 grams.
Sulphuric acid, U. S. P.	104 grams.
Alcohol sp. gr. .816	100 grams.
Water	1,000 grams.

The sodium nitrite was dissolved in 600 grams (or C.c.) of the water; this solution mixed with the alcohol; the mixture cooled to 10° C. and poured into a half-gallon retort, the retort placed in a bath of the same temperature, the sulphuric acid mixed with the remainder of the water (400 C.c.), the mixture cooled to 10° C. and cautiously and gradually added to the mixture in the retort. Distillation begins at once and continues sufficiently active throughout. By the time the operation has closed the temperature of the mixture in the retort will have risen to 26° C.

Heat may now be applied to the retort without any apparent effect and probably without doing any harm. Before disconnecting the apparatus 100 C.c. of a 5 per cent solution of carbonate of sodium were poured into the tubulated receiver through a thistle tube extending beneath the surface of the ether. There was no apparent change in the volume of the ether, showing the absence of alcohol, and very slight effervescence due probably to air or ether bubles, showing absence of acidity. After the receiver became perfectly cooled again its contents were poured into a tared separator, the aqueous liquid at once withdrawn and the separator weighed. Net weight of the ether was 110 grams, which was 74.8 per cent. of the theoretical yield. Two subsequent trials of the process were made, neither of which was satisfactory or as profitable as the one just described.

It was not convenient to make an assay of the product at this time. It was mixed with an equal quantity of alcohol and put away in a cool cellar. Some weeks afterward, when it was diluted to the proper strength for the U. S. P. spirit, an assay was made by the official method and the finished product was found to be $\frac{40}{55}$ of the full strength. This deficiency may have been due to some water weighed as ether and to evaporation during the interval, or it may have been due to decomposition.

The numerous washings directed by the Pharmacopœia are needless and wasteful. The first washing is especially wasteful for the reason that working with the official quantities there should not be less than 700 C.c.

of distillate, and to wash this with one-seventh of its volume of water would in the event of the distillate containing very much alcohol render the aqueous liquid so alcoholic as to cause a large loss of ether. If it contain a very small proportion of alcohol, as is most probable, it can be most effectively washed with about an equal quantity of water containing the alkaline carbonate. The use of carbonate of potassium is also superfluous. The quantity of water which nitrous ether will carry is constant and can be allowed for in making up the official spirit. Otherwise the presence of so small a quantity of water is unimportant. The Allen method of assay introduced into the Pharmacopœia for ease of execution and unvarying accuracy leaves nothing to be desired. Each succeeding edition of the U. S. P. informs us that sweet spirit of nitre should not effervesce when a crystal of bicarbonate of potassium is dropped into it. That is as true as Gospel, but if it is a test for acidity, as is commonly supposed, it is ridiculous. If the spirit were as acid as vinegar, it would fail to respond to such a test. It requires the presence of water to decompose the bicarbonate. In the recent edition of the U. S. Dispensatory is to be found, note on page 1270, a synopsis of a process given by Dunstan and Dymond for making nitrite of ethyl in the cold. The operation is a pleasing one, because the results are singularly true to theoretical calculation. The process is identical with that of the U. S. P., except that the ether is produced at a temperature of 0° C. or lower, and no distilling apparatus required. The facility with which nitrite of ethyl will form at this temperature readily explains many of the faults of the official process, and, in the hands of some ingenious pharmacist, suitable apparatus could be invented and an easy-working process elaborated.

THE CHAIRMAN: You have heard this paper; are there any comments, or has any one a word to say?

DR. ECCLES: Is there any member of the committee present who had charge of this preparation; something ought to come from them.

THE CHAIRMAN: I believe not. Has Prof. Oldberg any remarks to make on this subject?

MR. CASPARI: I think Prof. Patch had this in charge; I am sorry he is not in the room, as he might give us some information. He was the author of the official formula if I remember correctly.

THE CHAIRMAN: The chair would ask what is the pleasure of the Association. We have a number of papers on hand, and the authors are not present; now shall we proceed with the reading of the papers, or shall they be read by title?

Prof. Sayre then read the next paper, embodying his researches in connection with taraxacum root.

FURTHER NOTES ON TARAXACUM ROOT.

BY L. E. SAYRE.

A paper read at the last meeting of this Association endeavored to show the difference in composition of taraxacum roots collected in the various seasons of the year. Roots collected from March to the following February, inclusive, were analyzed and the amounts of the various constituents in each sample were reported.

During the last winter it has been my purpose to continue the investigations, and I have endeavored to answer several questions which have developed since taking up the subject, the first being suggested by the above investigation: What are the *causes* of the variation in the roots collected in the same season of the year from plants in the same stage of development? A second question was suggested by some of the members of this Association at the last meeting: What effect has drying upon taraxacum root; does it increase or diminish the quantity of the active principle, and what effect has this process upon the other constituents? A third question relating to this subject was also considered: What percentage of inorganic matter is contained in the inulin which is precipitated by alcohol from concentrated aqueous solutions of taraxacum—the process adopted by me for extracting inulin? (See Proceedings 1893, p. 81.) It may be remembered that the inulin reported by me was obtained by treating the drug, which had been previously treated with chloroform and then with alcohol, with warm water until exhausted, concentrating the aqueous solution, and adding to the evaporate three volumes of alcohol.

The report I have in this paper, then, relates to the following questions respectively:

(1) What is the difference between a taraxacum root grown in the rather *dry upland* and that grown in the *moist lowland?* Do the taraxacin and the other principles vary to any considerable extent?

(2) What effect has drying, say in the hot air oven at a temperature of 50° C. upon the drug? Does it increase or decrease the percentage of taraxacin, and what effect has it upon the other constituents?

(3) When a concentrated aqueous solution of taraxacum is treated with an excess of alcohol, what percentage of the precipitate is inorganic matter, and what proportion may be said to be inulin?

Before stating any results, I would say that five students, J. E. Northrup, L. C. G. Voeltzel, T. H. Kelly, W. O. Strother, and Miss Carrie Priestly, seniors in the laboratory, were specially instructed in this work, which was so distributed among them that duplicate analyses were being carried along simultaneously.

Attempting to answer the first question, I had the roots collected on the same day of the month from plants of about the same stage of development, collected on the *upland*, where the soil was comparatively dry, and from *lowland*, where soil was moist, in the months of September and October.

The following will show

DIFFERENCE BETWEEN TARAXACUM ROOT COLLECTED FROM UPLAND AND THAT COLLECTED FROM LOWLAND.

September.

Taraxacin	Increase of	0.026	per cent.	in lowland.
Resin	"	" 0.856	"	"
Sugar	"	" 0.690	"	"

October.

Taraxacin	Increase of	0.016	per cent.	in lowland.
Resin	"	" 0.770	"	upland.
Sugar	"	" 0.400	"	"

The inulin was not purified sufficiently to obtain an article of uniform composition, and no report will be made on it. The increase in inulin was decidedly in favor of the upland in both months, however.

To answer the second question, What effect has drying upon the drug? a number of analyses were made of the fresh root and of the same root dried at a temperature of 50° C. The method of analysis followed for the dried root was substantially the same as that given on page 81 of the Proceedings of 1893. For the purpose of examining the fresh root, it was chopped fine immediately after collection and placed in absolute alcohol; this alcoholic maceration was repeated three times. The dregs were then dried and examined for the various constituents not dissolved out by alcohol. The absolute alcohol extracted all of the bitter principle and the saccharine matter, the extration of the latter by absolute alcohol being made possible by the presence of moisture in the drug, which, diluting the alcohol, made it a solvent for the saccharine matter. It is not necessary for me to give further details with regard to the analysis of the fresh root, as it would be occupying unnecessary space.

Eliminating all those doubtful figures reported, which showed discrepancies, I think I can say that the following represents the average of results:

PERCENTAGE OF CONSTITUENTS FOUND IN FRESH TARAXACUM ROOT AND THE ROOT DRIED AT 50° C.

	Fresh Root.	Dried Root.
Taraxacin	0.052 per cent.	0.055 per cent.
Resin	0.456 "	0.388 "
Reducing Sugar	0.480 "	0.456 "

In regard to the third question, the percentage of inorganic matter in the inulin precipitated from aqueous solution, by alcohol, the following experiments were performed:

(1) One (1) Gm. of the well dried inulin thus precipitated was intro-

duced into a platinum crucible and incinerated. The loss in weight was computed and then recorded as organic matter. (Inulin?)

(2) One (1) Gm. of the well dried inulin was heated for some time with water acidulated with HCl until the inulin was converted into reducing sugar; the resulting solution was then estimated quantitatively for sugar by Fehling's solution. The amount of sugar multiplied by .9 was recorded as inulin. Below is found the percentage of inulin by the two methods:

PERCENTAGE OF INULIN IN PRECIPITATE.

By Incineration.

Amount.	Loss.	Per Cent. of organic matter (Inulin?)
1 Gm.	0.910 Gm.	91.

Treated with Acidulated Water.

Amount.	Reducing Sugar × .9.	Per Cent. of Inulin.
1 Gm.	0.878 Gm.	79.02.

From these data, and from the figures I obtained during the winter, I shall not attempt to say what the effect is of moist and dry soils, and that of drying the drug. I shall continue the work, and if in future trials I obtain similar results I shall have more data upon which to base conclusions. I shall also endeavor in a future year to ascertain the chemical nature of the principle taraxacin. I have already done some work in this direction, but do not feel justified now in making even a preliminary report.

Before closing this article I have to acknowledge the receipt of samples of taraxacum root collected, dried, and sent me by one of our members, Mr. W. C. Alpers, of Bayonne, N. J. The analysis of but one of these samples is completed at the present time. This was a root collected in September. The following is the result of the analysis:

Taraxacin	0.090	per cent.
Resin	2.876	"
Reducing sugar	4.000	"
Inulin	7.650	"

The amount of ash from this specimen was very large, amounting in the dried root to 15.1 per cent. The root collected and dried in the same month in Lawrence gave about half as much of ash, the latter giving 7.9 per cent. The great excess of ash from the former root must be due to adhering earthy matter. The amount of this extraneous inorganic matter was not estimated.

MR. LLOYD: I am glad to see that Prof. Sayre has followed up the work he took up last year on the taraxacum root. He spoke last year in Chicago, and has found it to be a greater study than he thought when he commenced, as we all find in taking up a study of this description. In inulin he presented the alkaloid question, and the point arose whether there might be an inorganic substance with inulin. I am glad to find he found ten per cent. or a little over ten per cent., which would be about what I would have supposed, proceeding on that line of investigation. In regard to taraxacin, I think if the Professor will continue the subject, he will find that it is not a simple substance, but it is a compound, and it will be an interesting work to continue; but I will not lay out work for other people. I am glad the Professor has settled some facts in that matter.

Mr. Sayre: As I stated, the work upon taraxacin is just begun; I might say I did not wish to report this at all. The point upon which the report will rest is that taraxacin seems to be a substance or a number of substances, united and ununited organic matter, and the crystals which I have figured in my last article do not represent crystals of taraxacin, as has been supposed to be taraxacin by various writers heretofore; my present feeling is that taraxacin is not a crystallizable body.

Mr. Hallberg: This subject of the investigation of taraxacum as taken up by Prof. Sayre is one which in so far as the drug taraxacum is concerned does not amount to much. Taraxacum is a drug which possesses very little, if any medicinal activity. I make this statement because I know that there are many pharmacists who think that possibly Prof. Sayre is wasting valuable time in prosecuting this investigation of taraxacum; on the other hand, Mr. Chairman, I desire to add my testimony to the value of his labor. Taraxacum is a drug which presents perhaps as good advantages, if not better advantages than any other drug for investigating and exploiting our knowledge with reference to the behavior and the characteristics of this drug as to its peculiar vegetable constituents, and while the investigations of Prof. Sayre of last year or possibly this year, and the discussion on it, may not bring any practical results, I for one hope that Prof. Sayre will continue these investigations not only for the next year, but for the next five or ten years, and follow this investigation up upon the lines that he has attempted until he finds some tangible results, and we will derive great benefit from the investigation.

Mr. Lloyd: Prof. Hallberg has said something which ought to be noticed. It seems to me that the returns are not always seen. We do not understand this matter, and think the positive result is the only valuable return; but even negative results prove finally to be as valuable as positive results might have been. We are led into directions we scarcely would have gone if we had thought about it when we commenced, and then, finally, in some way, we find it to be of value. It seems to me, on this question, the investigations are as important as those with reference to the derivative of hydrastine, which has been used instead of hydrastine. Prof. Sayre may not find the constituent of taraxacum of value, and there may be something else evolved that may be of value in medicine and in pharmacy, and it is only by these experiments that this question can be demonstrated; it does not follow that they are a loss, although there is no positive proof, so far as utility is concerned.

The Chairman: Is there any further discussion? If not, we will listen to a paper on Powdered Extracts by Prof. Hallberg.

Mr. Hallberg: Mr. Chairman and Gentlemen: This paper, unfortunately, is not in print, except a few copies in galley proofs, and I think I can run over it very briefly.

The following is the complete text of Prof. Hallberg's paper:

ON POWDERED EXTRACTS.

BY C. S. N. HALLBERG.

The dismissal of the abstracts from the United States Pharmacopœia, in the seventh decennial revision, has met with but little unfavorable criticism. They were regarded as not sufficiently concentrated for dispensing purposes, hence were seldom used; and yet pharmacists have, during all this time, been employing so-called powdered extracts of a strength not greater than that of the abstracts. Many powdered extracts on the market do not represent more than twice their weight of the drug, though pretending to be of the same drug-strength as the solid extract. Powdered extract of Cannabis Indica, purporting to be of the same strength as the solid extract, has been on the market for years. In one instance this claim has recently been corrected by furnishing this extract of much weaker strength, with the explanation that an extract of the former strength could not be prepared.

Powdered extracts are a great convenience, and as long as they are made by large manufacturers the pharmacist should at least endeavor to make them, if for no other reason, to ascertain if they can be made of the strength and physical properties claimed for the commercial product.

Several years ago we instituted some experiments in order to determine the particular menstruum best adapted for the extraction of certain drugs, so as to furnish the extract in the most concentrated form for the preparation of fairly stable powdered extracts, as nearly as possible of the same strength as the solid extracts.

I. Alcohol (94 p. c. vol.)—A full series of extractions (complete exhaustion) made with alcohol corroborates the experience of the past ten years of others, as well as of my own, that it does not furnish sufficiently concentrated extracts for the preparation of powdered extract of the strength of the former abstracts. Its use for more concentrated extracts is, therefore, out of the question.

II. Methyl alcohol (rectified).—A colorless and agreeably odorous article was employed. The percentages of extracts obtained are given. After extraction with methyl alcohol the marc of each drug was exhausted with alcohol (94 per cent. ethyl hydoxide) without obtaining extracts of any apparent medicinal activity.

The diluent used was milk sugar, as altogether there is no other substance so satisfactory in fulfilling all the requirements.

Extraction with methyl alcohol:

Drug.	Part.	Percentage of ext.	Percentage Sugar of Milk.	Percentage Strength. Drug 100.
Aconite	root	15	18	300
Belladonna	leaf	10	15	400
"	root	15	18	300
Digitalis	leaf	25	25	200
Hyoscyamus	"	10	15	400
Jalap	tuber	20	13	300
Nux vomica	seed	7	18	400
Podophyllum	rhizome	10	15	400

Of these aconite root, belladonna root and jalap may possibly be retained in powder form of the 400 strength. Digitalis, however, cannot be made of this strength. The powdered mixtures of the extracts were not homogeneous and did not present a fine appearance.

It is evident that methyl alcohol will not answer.

III. Extraction with menstrua of alcohol and chloroform in varying proportions. The best results were obtained by the use of a mixture of alcohol 75 C.c. and chloroform 25 C.c. The percentages of extracts obtained ranged from 6 per cent. to 15 per cent. In every case the extract, when mixed with sufficient milk sugar to make one-fourth the weight of the drug, furnished a nice-appearing, homogeneous powdered extract, which, from present indications, and from the comparatively small percentage of extracts contained in them, will retain the pulverized condition with ordinary care for any reasonable length of time.

From these investigations and considerations the following powdered extracts to replace the abstracts are proposed, and the general formula which is suggested should be incorporated in the definition of the abstracts to save space and needless repetition.

The term "abstract" may have to be retained. Personally I favor the descriptive term "quatract," meaning 4-times-extract, according to the plan for a nomenclature proposed by me in a paper read at the American Pharmaceutical Association, 1888.* I would be content with this term as a synonym. This would tend to draw attention to the increased strength of the preparation.

ABSTRACTA—QUATRACTA.

Powdered Extracts. A class of preparations containing the extractive of the drug in a powdered form, and of such strength that 1 gram represents 4 grams of the drug.

General Process—Take of the drug in very fine powder (No. 80), 100 grams; alcohol 300 C.c.; chloroform 100 C.c.; sugar of milk, powdered, a sufficient quantity. Mix the liquids and slightly moisten the powder with the menstruum. Introduce the moist powder in a narrow cylindrical percolator, press it firmly and pour the menstruum upon it. Continue the extraction according to the rules governing percolation, or by means of a continuous extraction apparatus, until the drug is completely exhausted. Place the percolate in a shallow, strong evaporating dish, and by gentle heat volatilize the liquid. To the soft extract obtained add 10 grams powdered sugar of milk, and when the mixture has become cold incorporate enough sugar of milk, if necessary, to make the product weigh 25 grams; transfer the mixture to the evaporating dish, and expose it to gentle heat until, when cold, a friable mass easily obtained in a finely powdered condition results. Transfer the powder to wide-mouthed vials, not to exceed 30 grams in capacity, cork tightly, and keep in a cool and dry place.

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* Nomenclature of Pharmaceutical Preparations, Rep. Proc., vol. xxxvi.

Then the list would be made up as follows:

Abstractum Aconiti Folii. Quatract of Aconite Leaf. Powdered Extract of Aconite Leaf.

One gram represents 4 grams of aconite leaf, and represents the extract of aconite leaf *weight* for *weight.*

Abstractum Aconiti Radicis. Quatract of Aconite Root. Powdered Extract of Aconite Root.

One gram represents 4 grams of aconite root, or about 7 decigrams (0.7) of extract of aconite root.

If not desirable to have both of these, the abstract of aconite leaf should be given the preference.

The use of aconite leaf extract in Gross' neuralgia pill and other preparations is far greater and of more importance than the use of the extract of the root in the aconite plaster. When extract of aconite is directed to be used, an extract of green color is required.

Abstractum Belladonnæ Folii.

One gram represents 4 grams of belladonna leaf and the extract of belladonna leaf practically weight for weight.

Abstractum Belladonnæ Radicis.

One gram represents 4 grams of belladonna root, or about 5 decigrams (0.5) of the extract of belladonna root.

The same remarks relative to the aconite extracts apply to these, only in greater degree.

Abstractum Digitalis.

One gram represents 4 grams of digitalis, and the extract of digitalis weight for weight.

Abstractum Hyoscyamus.

One gram represents 4 grams of hyoscyamus, or about 7 decigrams (0.7) of the extract of hyoscyamus.

Extractum Jalapæ.

One gram represenrs 4 grams of Jalap, or about 7 decigrams (0.7) of resin of jalap.

Abstractum Podophylli.

One gram represents 4 grams of podophyllum, or 4 decigrams of extract of podophyllum and about 2 decigrams (0.2) of resin of podophyllum.

The extraction with acetone has not been tried; it is possible that this solvent may present some advantages. With two powdered extracts, nux vomica and opium, official, though not recognized as "powdered" in their respective titles, the list may well be extended in the new revision.

Chicago, August 20, 1894.

Mr. Good: The criticism upon the point about these extracts may not be absolutely correct. This preparation in powdered form, one grain of which represents four grains of the drug, may not represent the solid extract, and I am not convinced that it does.

Mr. Hallberg: I would like to say to Prof. Good, if the Chair will permit me, that it does with the exception of the case of jalap—1 gramme represents 4 grammes of jalap. In the case of hyoscamus a gramme represents 7 decigrammes of extract, the percentage of the latter being 17 per cent. In the case of belladonna root 1 gramme represents ½ gramme of the extract of belladonna root; while in the case of belladonna leaf one gramme of the powdered extract represents one gramme of belladonna extract. This is about as close as we can obtain it, and it has been the opinion I believe of many pharmacists that it is preferable to take the drug itself as a standard than the extract in this class of preparations.

Mr. Good: Of course we may conceive that the solid extract from the leaves may be very often 25 per cent. or more, but as to the extract from the roots it is much smaller. I had really in my mind aconite root when I asked the question, and I think that Prof. Hallberg recommends the use of the leaves.

Mr. Lloyd: I think the Pharmacopœial Committee made a mistake when they introduced these preparations under the name of abstracts—I think it would have been better to have introduced them under the name of extracts.

The Chairman: I am very sorry indeed that we have come to a time when it will be absolutely necessary for us to close our session. It is now after six o'clock, almost seven, and I must do something which may be unprecedented, and that is to ask for a resolution. You have here upon the slip the names of the papers, and some of them I have not read, and I have left some of these until the last, because of the fact that many of these papers I have been requested to leave until the last, in order to allow the Association an opportunity to act upon others. It seems to me now, that inasmuch as the time has about expired for the meeting of the Scientific Section, that if you will pass a resolution that the remaining papers shall be received and referred to the committee on publication with power to act—it seems to me that will be the only way to do. I am very sorry, indeed, and I say so to those who are present, who are disappointed perhaps in not having the opportunity to read their papers, but it is absolutely impossible; but if some one will make this motion, it seems to me the only way out, unless we shall have the opportunity of having another session.

Mr. Caspari: Is it not usual to read such papers by title? I think as a matter of courtesy, it will be the better plan to read them by title, and then they can be received.

The Chairman then read the remaining papers by title, as follows:

Hydrocymenes and Derivatives. By Edward Kremers and Leo C. Urban.

The Use of Isobutylic Alcohol for the Detection of Morphin and Codein. By J. B. Nagelvoort.

A Method for the Estimation of Mono- and Bi-Carbonate of Sodium in Commercial Bi-Carbonate of Sodium. By Prof. Wm. T. Wenzell.

Alligation in Pharmaceutical Calculations—Its Usefulness and Limitations. By Prof. T. D. Reed.

Some Pharmaceutical Uses of Acetone. By J. E. Morrison.

The Testing for "Arsenic" of the U. S. P. By J. B. Nagelvoort.

The Opium Poppy in North Carolina. By Gerald McCarthy.

Do the So-Called Elegant Preparations of Cod-Liver Oil, from which the Oil has been Removed, Possess Therapeutic Value. By F. E. Stewart, M. D.

What is the Quality of the Reduced Iron Dispensed by Pharmacists. By A. R. L. Dohme.

Quantitative Determination of Some Substances in Aqueous Solution by Means of the Refractometer. By Prof. W. F. Edwards.

The Solubility of Canada Balsam in Alcohol. By J. E. Morrison.

Saw Palmetto. By C. C. Sherrard.

The National Formulary. By L. F. Stevens.

Do the so-called Elegant Preparations of Cod Liver Oil, from which the Oil has been Removed, Possess any Therapeutic Value? By Henry A. Stearns.

On motion, the above papers were received and referred to the Committee on Publication, with power to act.

(The text of these papers will appear in full at the end of the Minutes of this Session.)

THE CHAIRMAN: I would ask if there is anything remaining in the way of business? If not, we will proceed to the installation of officers, and then to the reading of the minutes, and then we will be ready to adjourn.

DR. ECCLES: I have a resolution that ought to be passed—some change should be made to strengthen our hands at the general meeting.

MR. WHELPLEY: If you will permit me, I will inform Dr. Eccles that the Council has already approved of an amendment to the Constitution, which changes the order of the Sections, and gives this Section one more session.

MR. GOOD: I am afraid Dr. Eccles will feel disappointed, but he will be highly gratified when I tell him that the idea was to give that additional time to the Section on Education and Legislation, and not to this Section.

DR. ECCLES: The time is needed in both Sections very badly, and I don't know but what we will have to have a longer session, and give the Section on Education and Legislation a longer time, more than two days. I think this Section will need it more than that Section.

MR. GOOD: We will ask for more time.

THE CHAIRMAN: I will appoint Prof. Hallberg and Prof. Fennel to conduct the newly elected officers to the platform to be introduced.

MR. HALLBERG: Mr. Chairman, we have the honor to present to you Dr. Dohme, of Baltimore, Md., and also Prof. Kauffman, of Ohio. (Applause.)

DR. DOHME: Mr. Chairman and Gentlemen: I wish to take this occasion to thank you very sincerely for the honor you have conferred upon me, and I regret that on account of the lateness of the hour and the condition of my voice, I am not able to say more.

MR. KAUFFMAN: Mr. Chairman and Gentlemen: I can only say that I fully appreciate the honors conferred, and I shall serve you to the very best of my ability. (Applause).

MR. LLOYD: Is a motion in order? If so, I would say I think that we all appreciate the work Dr. Dohme has accomplished in the direction of this Section, and the energy which he has given to original investigations during the last two years, and I offer this as a resolution—that we grant him a vote of thanks.

MR. HALLBERG: I second the motion.

This motion was carried by a rising vote.

DR. DOHME (in the chair): Gentlemen, I again take occasion to thank you and assure you of my sincere appreciation of this additional honor conferred, and only hope I shall be able to fulfil your expectations. I shall certainly endeavor to perform, to the best of my ability, the duties that this position entails.

MR. GOOD: I move that a vote of thanks be tendered, by this Section, to our retiring Chairman, Prof. Sayre, for the excellent work that he has done for us in the way of collecting papers and pushing the work of this Section.

This was seconded and carried.

MR. SAYRE: I am very much obliged to my friends, the members of the American Pharmaceutical Association, and I want to say in response to this hearty recognition of this work that, while it has been laborious, it has been to me one of the pleasantest years of my life in connection with the American Pharmaceutical Association. I think it has stimulated me more than anything else that I have had to do in connection with pharmacy, and I have to say that I appreciate your co-operation, and I trust that you will extend the same to the present incumbent.

THE CHAIRMAN: Gentlemen, I think there is one matter before us, before we adjourn, and that is the announcement of the third member to complete the Committee, which, as I understand it, is to be done by the gentlemen who have been elected to fill the offices of Chairman and Secretary. I would request the Secretary to inform the Section of the name of the gentleman who has been selected.

THE SECRETARY: The gentleman we have selected as our associate is Mr. J. O. Schlotterbeck, of Ann Arbor.

THE CHAIRMAN: Is there any further business to come before this Section? The Chair will take occasion to appoint a Committee consisting of Professors Hallberg and Oldberg, to conduct the gentleman to the platform and install him in his new position.

Mr. Schlotterbeck having been conducted to the platform, said:

Gentlemen, this is rather a surprise to me. I am rather a bashful young man, and this is only the second meeting I have attended. I have had a very pleasant time, and it is my intention to attend these meetings from now on, and I thank you very much for appointing me to this office. (Applause).

After the reading of the Minutes the Section then adjourned.

Appended are the papers read by title. (See pp. 248–249.)

HYDROCYMENES AND DERIVATIVES.*

BY EDWARD KREMERS AND LEO. C. URBAN.

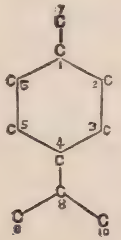
The study of the volatile oils has shown that many of their constituents are derivatives of paramethylisopropylbenzene, or of its reduction products, dihydrocymene, tetrahydrocymene, and hexahydrocymene.

It will be the purpose of this introduction to consider the number of possible chemical isomers of the more important classes of these derivatives. The geometric and enanthiomorphic isomeric modifications will be taken into consideration only in particular instances. Baeyer,[1] in a recent paper in the "Berichte d. Deutschen Chemischen Gesellschaft," has given a short review of some of the possible derivatives, and Wallach[2] has called attention to the series of oxygen derivatives to be expected from the various classes. The endeavor will be to present here a comprehensive view of these and other important classes of derivatives. The saturated derivatives are of a simpler nature than the other classes, and as Baeyer[3] has pointed out, serve as a convenient starting point for the study of these compounds as a whole.

Baeyer[1] has recently suggested a method of nomenclature laid down by the congress at Genoa. It is this nomenclature which has been followed; the common synonyms of the known compounds, however, are also given.

In explanation a brief statement of the nomenclature as applied by Baeyer to terpene literature, will be given here.

The carbon atoms in the cymene skeleton are numbered according to the following diagram:



The double bands in the unsaturated compounds are designated by the Greek △. $\triangle^1$ would represent the double bond in the nucleus from C^1 to C^2. A double bond from a carbon atom in the nucleus to a carbon atom in the side chain is represented by adding the number of the carbon atom in the side chain, to which the double bond extends, in parenthesis; thus $\triangle^1(^7)$ represents a double bond between C^1 and C^7.

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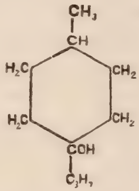
* Third Report to the American Pharmaceutical Association on menthol and substances derived therefrom.

The following schedule will give the new nomenclature as applied to the older names:

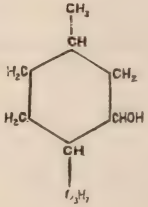
Terpane = Hexahydrocymene.
Terpene = Tetrahydrocymene.
Terpadiene = Dihydrocymene.
Terpanol = Menthol.
Terpenol = Terpineol.
Terpadiol = Terpin.
Terpanone = Menthone.
Terpadienone = Carvol (carvone).

Taking a few of the menthol derivatives as a basis, we have the following explicit designations:

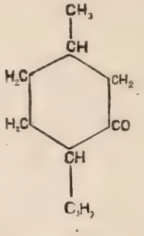
Tertiary menthol = Terpan-4-ol



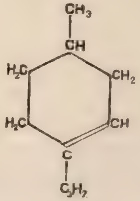
Menthol = Terpan-3-ol



Menthone = Terpan-3-one



Menthene = Δ^3 Terpene,
etc.

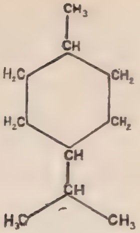


In presenting the number of possible derivatives of the various classes, those in which substitution has taken place in the side chains and those in which the double bond or bonds are partially or wholly in the side chains have been included, though, strictly speaking, these are not true cymene derivatives. It has been thought best to include these, inasmuch as they are closely related, so as to make it inconvenient to draw a sharp line of distinction.

Hydrocarbons.

Terpane, Hexahydrocymene, $C_{10}H_{20}$.

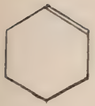
Of this we have only one structure :

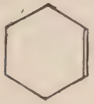


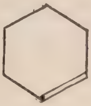
This possibly corresponds to the naphtene of Schtschukarew,[4] the menthonaphtene of Berkenheim.[5]

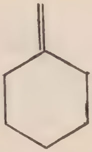
Terpenes, Tetrahydrocymenes, $C_{10}H_{18}$.

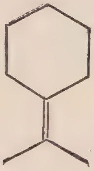
Six of these are possible, three containing the double bond in the nucleus, viz. :

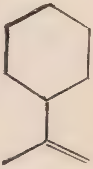

Δ^{1}


Δ^{2}


Δ^{3}


$\Delta^{1(7)}$

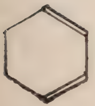

$\Delta^{4(8)}$

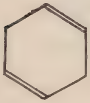

Δ^{8} terpene

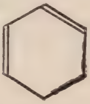
Δ^{1} Terpene corresponds to the carvomenthene[3] of Baeyer and Δ^{3} to menthene.[3] The others are unknown.

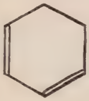
Terpadienes, Dihydrocymenes, $C_{10}H_{16}$.

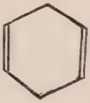
Fourteen are possible, viz. :

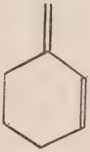

$\Delta^{1,3}$

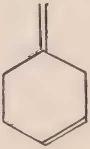

$\Delta^{1,4}$

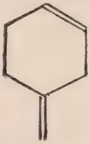

$\Delta^{1,5}$

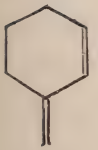

$\Delta^{3,5}$

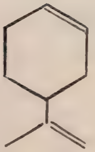

$\Delta^{2,5}$

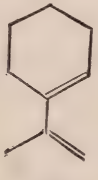

$\Delta^{1(7),2}$

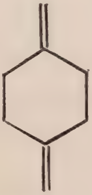

$\Delta^{1(7),3}$

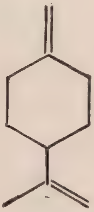

$\Delta^{1,4(8)}$

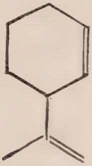

$\Delta^{2,4(8)}$


$\Delta^{1,8}$


$\Delta^{3,8}$


$\Delta^{1(7),4(8)}$


$\Delta^{1(7),8}$


$\Delta^{2,8}$ terpadiene.

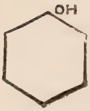
There are seven "terpenes" known, viz.: Pinene, camphene, limonene, terpinene, sylvestrene, terpinolene and phellandrene. Pinene and camphene do not however belong to the class of terpadienes. They belong to a class which contains but a single double bond and in which a parabond must be assumed. These are placed by Baeyer in a group called the camphane group.[1]

Limonene,[1] according to Baeyer is $\Delta^{1,3}$ terpadiene, terpinene[1] $\Delta^{1,5}$ terpadiene and terpinolene[1] $\Delta^{1,4(8)}$ terpadiene. Baeyer has obtained synthetically a terpadiene[1], similar in properties to terpinene, to which he assigns the formula $\Delta^{3,5}$ terpadiene. He has called attention to the fact that in the case of limonene, we have an instance of an optically active substance the molecule of which contains no asymmetric carbon atom in the sense of Lebel and vant' Hof's definition.

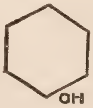
Alcohols.

Terpanols, Hydroxyhexahydrocymenes, $C_{10}H_{19}OH$.

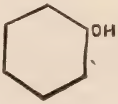
Seven isomers are possible, three of which are tertiary, two secondary and two primary alcohols. They are



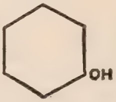
Terpan-1-ol



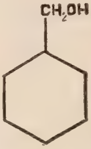
Terpan-4-ol



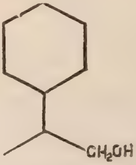
Terpan-2-ol



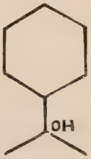
Terpan-3-ol



Terpan-7-ol



Terpan-10-ol



Terpan-8-ol

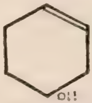
The four members of this group containing the alcohol radical in the nucleus are known.

Terpan-1-ol = Tertiary carvomenthol.[6]
Terpan-4-ol = Tertiary menthol.[6]
Terpan-2-ol = Carvomenthol.[3]
Terpan-3-ol = Menthol.[3]

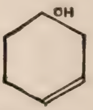
Terpenols, Hydroxytetrahydrocymenes, $C_{10}H_{17}OH$.

Of these there are forty-three isomeric structures possible, twenty-six containing the substituting group in the nucleus.

The terpineols belong to this group. Δ^{1} Terpen-4-ol represents the structure of the crystalline terpineol,[7 8] and Δ^{3} terpen-1-ol the liquid terpineol,[9] both bodies being formed by the splitting off of water from terpin.[9]

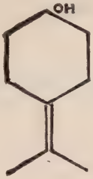


Δ^{1} Terpen-4-ol,
Crystalline terpineol.

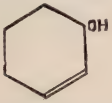


Δ^{3} Terpen-1-ol,
Liquid terpineol.

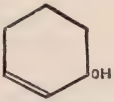
A third terpineol, Baeyer[1] has obtained from the tribrom-terpin of Wallach. To this he assigns the formula of

$\Delta^4(^8)$ Terpen–1–ol 

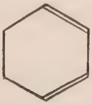
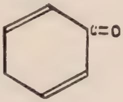
The other known compounds of this group are

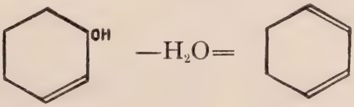


Δ^3 Terpen–2–ol.
Dihydrocarveol.



Δ^4 Terpen–3–ol.
Alcohol from Nitrosomenthene.

Dihydrocarveol must have the structure assigned to it if [the structure given by Baeyer[1] for limonene is accepted. If limonene be  then carvol, considering the formation of carvoxime from limonene nitrosochloride by splitting off hydrochloric acid, must be  Recently Baeyer[10] has deduced the formulas for carvol, isocarvol and eucarvol from a comparison of the readiness with which they are converted into carvacrol. The formula he assigned to carvol agrees with the above. Dihydrocarveol on dehydration yields dipentene,[7] the formation of which is only explained by the assumption of the formula given

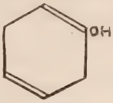


Dihydrocarveol. Dipentene.

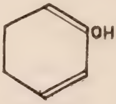
Δ^4 Terpen–3–ol is the alcohol to be described later, obtained by diazotizing the corresponding amido-compound formed upon reduction of the so-called nitrosomenthene.

Terpadienols, hydroxydihydrocymenes, $C_{10}H_{15}OH$. Eighty-seven structures are possible; twenty-two containing the substituting group and both double-bonds in the nucleus, thirty-four containing the hydroxy-group and one double bond in the nucleus, and five containing the hydroxy group in the nucleus and both double bonds in the side chains, the balance, twenty-six in number, containing the substituting group in the side chain.

Three alcohols of this class have been obtained, but the positions of their ethylene bonds are not yet established.

To the alcohol obtained by the dehydration of a trihydroxyhexahydrocymene, an oxidation product of terpineol, Wallach[12] gives the formula 

$\Delta^{1,4}$Terpadien-2-ol.

That obtained by the inversion of tanacetone, Semmler[13] considers as 

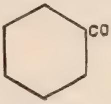
$\Delta^{1,3}$ Terpadien-2-ol.

The third alcohol belonging to this group is that obtained from pinylamine.[11]

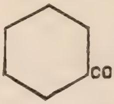
Ketones.

Wallach[2] distinguishes between α and β ketones. α ketones are those in which the carbonyl group is in ortho positions to the carbon atom in connection with the methyl group, and β ketones those in which it is in ortho position to the carbon atom in connection with the isopropyl group.

Terpanones, Ketohexahydrocymenes, $C_{10}H_{18}O$. Of these there are but two, carvomenthone[3] being the α-ketone and menthone[14] the β-ketone.



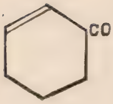
Terpan-2-one.
Carvomenthone.



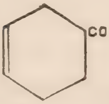
Terpan-3-one.
Menthone.

Terpenones, Ketotetrahydrocymenes, $C_{10}H_{16}O$. Eleven α-ketones of this type are possible and an equal number of β-ketones.

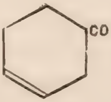
The α-ketones are



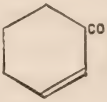
Δ^{6}



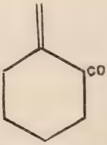
Δ^{5}



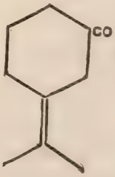
Δ^{4}



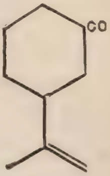
Δ^{3}



$\Delta^{1}(^{7})$



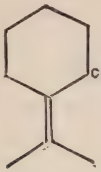
$\Delta^{4}(^{8})$



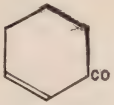
Δ^{8} Terpen-2-one.

Dihydrocarvone is the representative of the α-ketones; its structure depends upon that of dihydrocarveol, and is therefore that of Δ^{3} terpen-2-one.

Of the β-ketones, pulegone[14] and the ketone obtained from the so-called nitrosomenthene, to be later described, are representatives.



$\Delta^{4(8)}$ Terpen-3-one.
Pulegone.

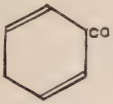


Δ^{4} Terpen-3-one.
Ketone from $C_{10}H_{17}NO$.

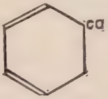
Terpadienones, Ketodihydrocymenes, $C_{10}H_{14}O$.

There are possible fourteen α-ketones and fourteen β-ketones of this class.

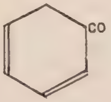
Carvol, eucarvol and isocarvol are members of this group. Baeyer[10] assigns to them the following formulas:



$\Delta^{3,6}$ Terpadien-2-one.
Carvol.



$\Delta^{4,6}$ Terpadien-2-one.
Eucarvol.



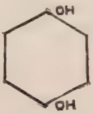
$\Delta^{3,5}$ Terpadien-2-one.
Isocarvol.

The formula of carvol deduced from that of Baeyer's limonene formula agrees with the above.

The ketone obtained by the oxidation of pinyl alcohol,[11] is probably a β-ketone of this class.

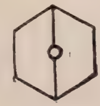
Terpadiols, Dihydroxyhexahydrocymenes, $C_{10}H_{20}O_2$.

Twenty-four diatomic alcohols of this class are possible. Terpin[15,16] is the representative.

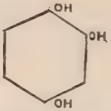


Terpa-1,4-diol.
Terpin.

As the first dehydration products of terpin, we have the terpineols and cineol.[15] Cineol must be considered as the anhydride of terpin, having

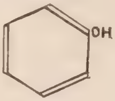
the structure 

Pinol[17] is an unsaturated oxide,[19] pinol hydrate an unsaturated glycol,[18] and pinol glycol,[18] a mixed compound, being both a glycol and oxide.

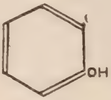
A triatomic alcohol of the structure  has been obtained by Wallach,[12] on oxidizing terpineol with alkaline permanganate solution.

Phenols, $C_{10}H_{13}OH$.

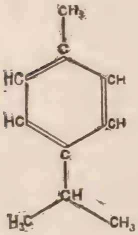
The two phenols are carvacrol and thymol.



Carvacrol.



Thymol.

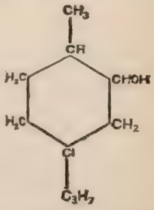
i-Cymene, $C_{10}H_{14}$. 

i-Cymene, the hydrocarbon which may be considered the basis of all the compounds reviewed, itself occurs in a number of volatile oils, as oil of thyme, the oil of Cicuta virosa,[20] etc.

Of the substitution products of great importance in the study of these compounds are the halogen and amido derivatives. These will of course show the same cases of isomerism as are shown by the hydroxy derivatives.

The above review will show the complexity of the cases of isomerism to be expected from this class of bodies, and is an argument in favor of some such system of nomenclature as that suggested by Baeyer.

Menthol.

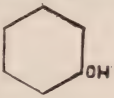
Now that the constitution of menthol has been established, and since most of the text-books on organic chemistry, as Richter,[21] Roscoe and Schorlemmer,[22] and others, employ the incorrect formula  a brief review of the literature which has contributed to this result may not be out of place.

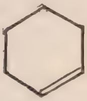
Menthol was first recognized as an alcohol by Oppenheim[23] in 1861, first, by its action towards metallic sodium, forming sodium mentholate; second, by its action towards the halogen acids and the phosphorus halogens, forming the menthyl halides; third, by the formation of esters when treated with acid anhydrides.

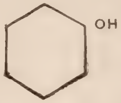
By oxidizing it with chromic acid mixture, Moriya[24] obtained a body, $C_{10}H_{18}O$ (menthone) which bore the same relation to menthol that camphor bore to borneol. Beckmann[25] demonstrated the ketone character of the oxidation product by the preparation of its oximido derivative, showing menthol to be a secondary alcohol.

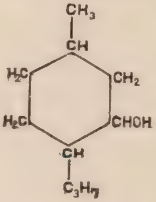
Menthol, when treated with dehydrating agents, readily splits off a molecule of water, forming the hydrocarbon menthene. Beckett and Wright[26] claim to have obtained a tetrabromide of menthene upon treating this with a solution of bromine in potassium bromide. This tetrabromide, treated with sodium, splits off hydrobromic acid, yielding cymene. Cymene has also been obtained by Brühl[27] by oxidizing menthol or menthone with anhydrous copper sulphate. The formation of cymene,[28] in this manner indicates the presence of a closed chain in the compound, with menthyl and isopropyl groups in para position. The molecular refraction of menthol [29] confirms this assumption. An alcohol of the formula $C_{10}H_{19}OH$, were it an open chain, would necessarily contain a double bond and a hydrocabon $C_{10}H_{18}$ two double bonds, whereas the molecular refraction of menthol shows the absence of a double linkage, and that of menthene has but a single double linkage. The tetrabromide of menthene obtained by Beckett and Wright, must therefore have been formed by the splitting of the ring, or as Brühl suggests, it is a molecular compound $C_{10}H_{18}Br_2,Br_2$.

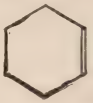
On account of its analogy with borneol,[29] the alcohol group has been assumed to be in the ortho position to the methyl group.

Atkinson[30] first suggested the formulæ 

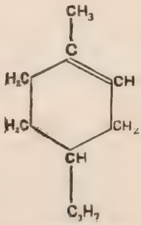
and  for menthol and menthene respectively, without, however, giving any reasons in support of them. Arth,[33] by oxidizing menthol with acid permanganate solution obtained an acid $C_{10}H_{18}O_3$, as well as an acid $C_7H_{12}O_4$, which he called β-pimelic acid. Mehrländer[31] obtained the acid $C_{10}H_{18}O_3$, using chromic acid as an oxidizing agent, and found that this was further oxidized by alkaline permanganate to the acid $C_7H_{12}O_4$. This he assumed to be identical with propylsuccinic acid, the melting points of the acids varying but a few degrees, and from it drew the conclusion that the hydroxy group in menthol actually occupied the position assigned to it next to the methyl group. Arth,[32] however, has shown that the two acids are quite different, their amides showing a difference in melting points as great as 31°. The conclusions of Mehrländer could not therefore hold. More recently, Semmler,[14] in his oxidation experiments with pulegone obtained, besides a ketone, β-methyladipinic acid $HOOCCH_2CH_2CH(CH_3)CH_2COOH$, which evidently is the same as the β-pimelic acid of Arth and Merhländer. From this it appeared that the carbonyl group in pulegone, and consequently in menthone, menthone being a hydride of pulegone, is in ortho position to the carbon atom in connection with the isopropyl group.

By his recent work on carvomenthol, Baeyer[3] has settled any doubt as to the position of the alcohol group in menthol. Setting out with carvol, the position of the carbonyl group in which is ascertained by its conversion into carvacrol, he obtained by successive reduction, dihydrocarveol and tetra-hydrocarveol or carvomenthol. The differences between carvomenthol, which must possess the structure  and menthol are such that the oxygenated group in the latter must be in the only other position permissible in a secondary alcohol which is a derivative of hexahydrocymene, viz.:

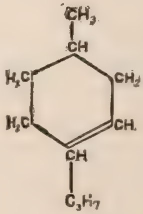


It was in connection with his study of carvomenthol that Baeyer has demonstrated the position of the double bond in menthene. If in the splitting off of water from menthol in the formation of menthene the hydroxyl group goes out with a secondary hydrogen atom, then carvomenthol upon hydration ought to yield the same hydrocarbon, viz.: 

The hydrocarbons are, however, quite different, showing that it is with the tertiary hydrogen atoms that the hydroxyls split off, and that accordingly the structures of the hydrocarbons are



Carvomenthene.



Menthene.

Menthol, as will be seen by a glance at its structure, contains three asymmetric carbon atoms, and may therefore show four forms of geometric isomers, each geometric isomer in turn being capable of existing in two optically active forms, which may again form inactive racemic mixtures, making the total number of modifications possible twelve.

Representing the action upon polarized light of the three asymmetric carbon atoms by A, B, C respectively, the possible active forms may be graphically represented as follows:[35]

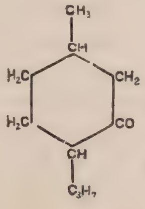
$$\begin{matrix}\text{A.}\\ \text{B.}\\ \text{C.}\end{matrix}\quad \underbrace{\begin{matrix}+ & -\\ + & -\\ + & -\end{matrix}}_{\text{I.}}\qquad \underbrace{\begin{matrix}- & -\\ + & -\\ - & +\end{matrix}}_{\text{II.}}\qquad \underbrace{\begin{matrix}- & -\\ - & +\\ - & +\end{matrix}}_{\text{III.}}\qquad \underbrace{\begin{matrix}- & -\\ - & -\\ + & -\end{matrix}}_{\text{IV.}}$$

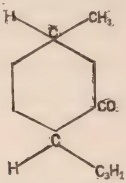
The pairs marked I., II., III. and IV. respectively may form inactive racemic mixtures. That such differences, as for instance exist between forms I. and II., are due to a geometric isomerism similar to that of Baeyer's cis- and trans-hydropthalic acids has been pointed out by Wallach[37] in connection with his study of the menthylamines.

The only secondary menthol known is the laevomenthol obtained from oil of peppermint.

Menthone. Upon oxidation, menthol yields the ketone menthone. The product obtained by Moriya[24] was optically inactive. Atkinson and Yoshida[34] later obtained a dextrorotatory menthone and attributed the inactivity of Moriya's compound to the presence of some unchanged menthol. Beckmann[25] has shown that menthol can be quantitatively oxidized to laevogyrate menthone and that the inactivity of Moriya's menthone and the dextrorotation of Atkinson and Yoshida's must be considered to be due to the inverting action of the heat and acid employed in the process of oxidation. He has shown that by the action of heat and acids, laevogyrate menthone can be converted into a dextrorotatory form, and that the differences between the two are to be ascribed to geometric isomerism.

Lævogyrate menthone obtained by the oxidation of menthol, yields a crystalline oxime melting at 58°, while the dextrorotatory menthone yields a liquid oxime. Beckmann and Pleissner[36] have obtained upon reduction of pulegone a laevorotatory menthone yielding an oxime melting at 82°. An optically inactive menthone, to be described later in the experimental part of this paper, has been obtained as a by-product in the reduction of "nitroso-menthene," yielding an oxime showing the same melting point as Beckmann and Pleissner's menthoxime.

Menthone  contains two asymmetric carbon atoms, and may show two geometrically isomeric forms represented by the structures



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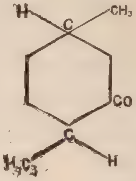


each of which may occur in two optically active modifications. It would seem that the two geometric forms are represented by the menthones yielding oximes melting at 58° and 82° respectively; the enanthiomorphic forms of these ought to show only a difference in the direction of rotation. The viscid oxime from the dextrorotatory menthone obtained by the action of acids upon lævogyrate menthone would hardly appear to be a uniform compound, and may be due to the fact that dextrorotatory menthone is a mixture of geometric isomers.

Menthylamine having three asymmetric carbon atoms, may show the same number of isomeric modifications as menthol. Wallach[37] has obtained by the action of ammonium formate on menthone, two menthylamines differing in physical behavior to a marked degree, and which must be considered as geometric isomers. Upon reduction of lævogyrate menthoxime, only lævogyrate menthylamine was obtained. The liquid oxime from dextrorotatory menthone yields principally the lævogyrate menthylamine.

Menthene has but a single asymmetric carbon atom. It may be obtained

1st. Upon dehydration of menthol.

2d. By splitting off hydrohalogen from the halogen esters of menthol.

Tertiary menthol and tertiary menthyliodide, according to Baeyer, yield the same menthene.[38]

Menthene obtained by the dehydration of menthol is dextrorotatory. Berkenheim[39] has obtained by heating menthyl chloride with acetic acid and acetate of potassium in a sealed tube for several hours at 150° a menthene turning the plane of polarization 38° to the left.[40] The dextrogyrate menthene obtained by the dehydration of menthol has received considerable attention in this laboratory.

It forms a crystalline nitrosochloride[41] and nitrosate.[42] These compounds both yield the same nitrolamine base when treated with benzylamine. They yield the same nitrosomenthene upon splitting off hydrochloric acid resp. nitric acid. Piperidine acts towards the nitrosochloride like the fixed alkalies, hydrogen chloride splitting off with formation of nitrosomenthene.[42] The reaction with aniline appears to be of a complicated nature, amidoazobenzene being formed together with aniline hydrochloride, nitrosomenthene and an oil which has not been further examined. The amido compound obtained by the reduction of nitrosomenthene, its nitrate and its hydrochloride, have been described under the name of menthylamine and its salts.[42] The results obtained by former analyses did not allow of a choice between the formulae $C_{10}H_{19}NH_2$, a saturated compound, and $C_{10}H_{17}NH_2$, an unsaturated compound. That the latter must be considered the correct formula will be shown later.

Menthene nitrosochloride.

This was first described as melting at 113° and as being dextrogyrate. $[\alpha]_D = + 13.85.°$ The melting point of the nitrosochloride which had been in contact with the mother liquor for some time, has since been observed to be *128*°, and was found to be optically inactive. This nitrosochloride had been recrystallized from various solvents, as chloroform, acetic ether, etc., and in each case showed the same melting point, 128°.

This observation, together with the statement made by Baeyer[43] that a menthene obtained from the reduction product of terpineol, yielded a nitrosochloride melting at 146°, "wie gewöhnliches menthen" induced a more careful examination of the physical properties of this compound. Messrs. Richtman and Helbing accordingly prepared the nitrosochloride from menthenes obtained by the dehydration of menthol by means of potassium acid sulphate and anhydrous cupric sulphate respectively. The nitrosochloride was dissolved in chloroform and precipitated in fractions by means of alcohol.

The following data were furnished:

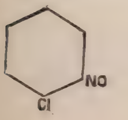
I. A nitrosochloride, m. p. 113°, $[\alpha]_D = + 9.83°$ obtained from menthene prepared by dehydrating menthol with potassium acid sulphate.

II. A nitrosochloride, m. p. 114°, $[\alpha]_D = + 20.64°$ obtained from menthene prepared by means of anhydrous copper sulphate.

I.			II.		
Fraction	m. p.	$[\alpha]_D$	Fraction	m. p.	$[\alpha]_D$
1	121°–122°	—2.45°	1	114½°	+1.01°
2	118°–119°	+3.75°	2	109°	+16.75°
3	117°–118°	+16.44°	3	111°	+31.23°

In no case was a melting point observed as high as that given by Baeyer. From these data it will appear that the active nitrosochlorides, melting at a lower temperature, unite to form a racemic inactive isomer melting at a higher temperature, viz. 128°, and that the varying melting points as shown above are due to varying mixtures of the active modifications with the racemic form.

Menthene nitrosochloride as will be seen later, has either the structure.



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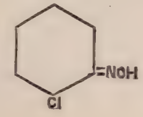
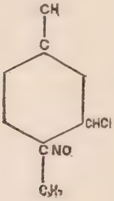


According to whichever formula is accepted, the molecule contains either three or two asymmetric carbon atoms and may appear in a number of geometrically isomeric forms. Baeyer has given no details as to his method of preparation of the nitrosochloride: certain it is that by the process employed in this labratory no nitrosochloride of a melting point of 146° is obtained.[45]

The addition of $\left\{\begin{matrix}\mathrm{NO}\\\mathrm{Cl}\end{matrix}\right.$ to menthene can take place in two different ways, viz.:



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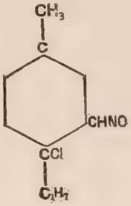

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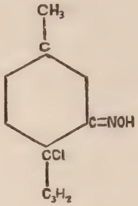


In order to ascertain the position in which the nitroso group is added in the formation of the nitrosochloride, an attempt was to be made to convert the socalled menthylamine into the corresponding alcohol through the diazocompound. If the nitroso group took the place of the hydroxyl group in menthol, this compound should be regenerated from the menthylamine; if it was added to the carbon atom connected with the isopropyl group, a tertiary menthol was to be expected. The position of the groups has been established beyond a doubt, but as will be seen, in a very different manner than that outlined.

Experimental Part.

The menthene employed was prepared in the manner described by Brühl,[44] using anhydrous copper sulphate as a dehydrating agent. Upon repeated fractionation with a column after Lebel and Henninger, a product was obtained boiling at 165½° at a pressure of 739 Mm. Its specific gravity at 20° was 0.8132. In a 100 Mm. tube it turned the plane of prolarized light 26.66° to the right, hence $[\alpha]_D = +32.77^\circ$.

Menthene nitrosochloride.

This was prepared according to directions given in a former report.[41] The yield of nitrosochloride was slightly increased by frequently shaking the mother-liquor after the separation of the first crop of crystals. From 780 cc. of menthene, 215 grams of the nitrosochloride were obtained, or about 4.11 grams from 15 cc., while the highest amount obtained without this shaking was below 4 grams from 15 c.c. of menthene.

The great stability of the nitrosochloride is shown in that it is apparently unaffected by boiling with water, dilute acids, or dilute potassa solution.

Nitrosomenthene.

When the nitrosochloride is heated in quantities of a gram or more in a tube by itself to about 115°, sudden decomposition takes place, hydrochloric acid is given off and nitrosomenthene sublimes slowly, condensing in the upper part of the tube in beautiful colorless needles.

A more rapid separation of the nitrosomenthene from the dark-colored by-products resulting in small quantity upon decomposing the nitrosochloride in this manner, is effected upon distillation of the product with water vapor. The nitrosomenthene passes over slowly, solidifying in the receiver to a white mass, which when spread on porous plate and dried, melts at 67° without further purification.

This method for the purification of the nitrosomenthene has also been employed in separating it from the thick viscid mass remaining from the mother liquors obtained on recrystallization of the nitrosomenthene prepared by heating the nitrosochloride with alcoholic potassa.[41]

Reduction of nitrosomenthene.

Nitrosomenthene, melting at 66° to 67° was reduced by means of acetic acid and zinc dust and the resulting amido compound separated in the form of nitrate in the manner indicated in a previous report.[42] It melted at 172°–173° with decomposition.

This base has been looked upon as a saturated compound, since by the method of reduction employed such a compound might be expected. Upon treatment of this compound with nitrous acid a menthol $C_{10}H_{19}OH$ had therefore been expected.

Alcohol, $C_{10}H_{18}O$.

20 grams of the nitrate were dissolved in acetic acid and 8 grams of sodium nitrite gradually added. An oily liquid separated slowly. When the reaction was completed, the solution was made slightly alkaline and distilled with water vapor. The oily liquid was separated and exposed to cold. It had a strong peppermint odor. After some time, small white crystals separated which melted at 89°–90° and were soluble in acidulated water. As this indicated a presence still of basic matter, the oil was shaken with an aqueous solution of oxalic acid and again distilled with water vapor. The oil resulting was placed in the cold for several days, and as no crystals formed, an attempt was made to fractionate it. Upon heating the substance, nitrous fumes were evolved. The heat was immediately removed and the oil heated for some time with a solution of potassa in order to saponify any nitrous acid ester and the product, after distillation with water vapor, dried and fractionated. The larger portion of it passed over between 210° and 215°. No crystals could be separated upon exposure to cold for some time.

Upon analysis, fraction 210°–215° yielded the following results :

I. 0.1298 gram gave 0.3795 gram CO_2 = 0.101045 gram C.
and 0.1349 gram H_2O = 0.014988 gram H.
II. 0.1779 gram gave 0.5078 gram CO_2 = 0.13849 gram C.
and 0.1832 gram H_2O = 0.020355 gram H.

	Calculated for		Found	
	$C_{10}H_{20}O$	$C_{10}H_{18}O$	I.	II.
C.	76.92 per cent.	77.91	77.84	77.84
H.	12.82 per cent.	11.69	11.54	11.44

Although the figures for hydrogen are rather low, the results obtained correspond very well with the figures calculated for a compound $C_{10}H_{18}O$.

The oil in ethereal solution readily absorbed bromine, showing it to be an unsaturated compound. When treated with chromic acid mixture, it formed a dark colored chromium compound which liquefied upon warming the mixture.

The alcohol being an unsaturated compound, the amido-compound from which it was obtained must be unsaturated, and the formula $C_{10}H_{17}NH_2$ may be assigned to it.

That the amido-compound is not menthylamine is also indicated by the fact that it cannot be distilled with water vapor without decomposition, menthylamine, according to Wallach,[37] undergoing no change upon such treatment.

All of these experiments are being repeated in this laboratory, and a special study of the amido compound with respect to its saturation will be made. The position of the amido and hydroxyl groups in the respective compounds will be spoken of later.

Inactive Menthone, $C_{10}H_{18}O$.

During the reduction of the nitrosomenthene in the preparation of the amido compound, there separated as a by-product an oily liquid having the odor of menthone. This was separated after the completion of the reaction from the solution of zinc acetate and amido-acetate by distillation with water vapor. The oil was separated, dried with anhydrous sodium sulphate and fractionated. Fractions boiling between 204° and 206° and between 206° and 208° were obtained. Most of it passed over between 204° and 206°, and a very small amount remaining above 208°. Upon combustion fraction 204° to 206° yielded the following results:

I. 0.2064 gram yielded 0.5883 gram CO_2 = 0.160445 gram C.
and 0.2198 “ H_2O = 0.024422 “ H.
II. 0.1690 gram yielded 0.4781 “ CO_2 = 0.13039 “ C.
and 0.1821 “ H_2O = 0.020233 “ H.
III. 0.1727 gram yielded 0.4925 “ CO_2 = 0.134318 “ C.
and 0.1850 “ H_2O = 0.020555 “ H.

	Calculated for	Found		
	$C_{10}H_{18}O$.	I.	II.	III.
C.	77.91 per cent.	77.73	77.15	77.77
H.	11.68 “	11.83	11.97	11.90

The results of the combustion leave no doubt as to its empirical composition. Its boiling point agrees very well with that of menthone. Its specific gravity at 18° C. was found to be 0.9071. It was *optically inactive.* Like laevogyrate menthone, it is readily converted into the oxime. It was heated for ten minutes in alcoholic solution with hydroxylamine hydrochloride and sodium bicarbonate in the proportions given by Beckmann[25] for the preparation of menthoxime. The solution was filtered while hot and set aside to crystallize. The oxime separated in thick masses of slender needles, which when spread on porous plate and dried melted at 78°. The recrystallized product melted at 82°.

When hydrochloric acid is passed into a solution of the oxime in dry ether, a white crystalline separation of the hydrochloride takes place, which is readily soluble in an excess of the acid.

The ketone character of the compound cannot be doubted. Beckmann and Pleissner[36] have obtained by the reduction of pulegone ($\Delta^{4(8)}$ terpen–3–on) a menthone yielding an oxime melting at 84°—85°. The ketone regenerated from the oxime yielded an oxime melting between 80° and 82°. This menthone was lævorotatory, whereas pulegone is dextrorotatory. It is therefore quite possible that the menthone obtained in the reduction of nitrosomenthene is the optically inactive variety of that obtained by Beckmann and Pleissner in the reduction of pulegone.

Menthol.

The menthone was reduced according to Beckmann's method.[46]

The menthone was diluted with several times its volume of ether, and heated for some time with metallic sodium in a flask connected with a reflux condenser. The ethereal solution was separated from the excess of sodium and shaken with water; it was then removed from the aqueous liquid, the ether allowed to evaporate and the product dried. This was again dissolved in ether and treated a second time with metallic sodium. The resulting product was then distilled with water vapor, and the oily liquid after separation exposed to cold. After several days it congealed to a crystalline mass. The crystals spread on porous plate and dried, melted at 24°–26°. They were exposed to air for some time and placed over sulphuric acid, but the melting point could not be brought above 31°. The quantity obtained was too small to admit of purification by recrystallization or other means. The crystals had the pungent and cooling taste and odor of menthol, quite different and easily distinguishable from that of menthone.

Larger quantities will be prepared, and its properties more accurately determined.

The reduction of menthone by the process given is represented by the following equations:[46]

$$2C_{10}H_{18}O+Na_2=C_{10}H_{17}ONa+C_{10}H_{19}ONa,$$
$$C_{10}H_{17}ONa+C_{10}H_{19}ONa+2H_2O=C_{10}H_{18}O+C_{11}H_{19}OH+2NaOH,$$
$$C_{10}H_{18}O+C_{10}H_{19}OH+Na_2=2C_{10}H_{19}ONa,$$
$$2C_{10}H_{19}ONa+2H_2O=2C_{10}H_{19}OH+2NaOH.$$

The formation of menthone, $C_{10}H_{18}O$, a ketone as a by-product in the reduction of nitrosomenthene in acid solution, indicated that the nitrosomenthene is an oxime, that a partial hydrolysis takes place, hydroxylamine splitting off, and that the ketone $C_{10}H_{16}O$, which is probably formed, is reduced by the nascent hydrogen to the saturated ketone, $C_{10}H_{18}O$.

It was therefore expected that the ketone $C_{10}H_{16}O$ could be isolated, and "nitrosomenthene" regenerated by treating it with hydroxylamine.

Ketone $C_{10}H_{16}O$.

18 grains of nitrosomenthene were dissolved with the aid of a gentle heat in twice its weight of hydrochloric acid (s. g. 1.20), and diluted with an equal volume of water. It was warmed for a short time and then distilled with water vapor. A colorless oil passed over which became yellowish on exposure for a short time. It had a mild peppermint odor reminding somewhat of pulegone. It was dried with potassa and subjected to fractional distillation. Most of it passed over between 208° and 212°, a very small quantity remaining above this temperature. Fraction 210°–212° was the largest. At 20° it had a specific gravity of 0.9150 and was optically inactive.

Analysis yielded the following results :

I. 0.1676 gram gave 0.4818 gram CO_2=0.13140 gram C.
and 0.1603 gram H_2O=0.17811 gram H.
II. 0.2072 gram gave 0.5967 gram CO_2=0.162736 gram C.
and 0.1994 gram H_2O=0.0227 gram H.

	Calculated for $C_{10}H_{16}O$	Found I	Found II
C	78.94 per cent.	78.40	78.54
H	10.52 per cent.	10.62	10.95

The acid liquid remaining in the flask after distilling off the ketone with water vapor immediately reduced Fehling's solution, showing the presence of hydroxylamine.

The formation of the ketone then takes place according to the equation : $C_{10}H_{16}NOH + H_2O = C_{10}H_{16}O + NH_2OH$.

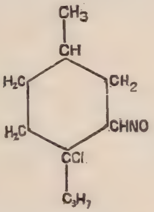
Oximido-derivative $C_{10}H_{16}NOH$.

To convert the ketone $C_{10}H_{16}O$ into the oxime, three grams of the fraction 210°–212° were dissolved in two and one-half times its weight of alcohol and treated with two grams of hydroxylamine hydrochloride and three grams of sodium bicarbonate. The mixture was heated for two hours on a water bath in a flask connected with a reflux condenser. The solution was filtered while hot and set aside. After the evaporation of the alcohol, a thick viscid mass remained, which was purified by distillation with water vapor. The oxime distilled over slowly and congealed to a white crystalline mass. When spread on porous plate and dried, it melted without further purification at 67°. Crystallized from methyl alcohol it was obtained in crystals having the characteristic appearance of nitrosomenthene and melted at 67°.

The identity of the oxime with nitrosomenthene can therefore not be doubted and the presence of an oximido group $=NOH$ in nitrosomenthene must be assumed.

Conclusions.

It will be seen from the foregoing experiments that the nitrosylchloride addition product of menthene has the structure



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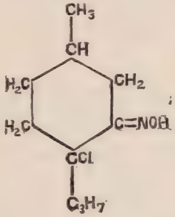
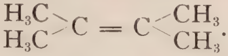
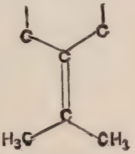


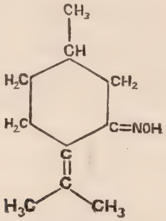
The formation of the ketone $C_{10}H_{16}O$, of menthone $C_{10}H_{18}O$ and of menthol $C_{10}H_{19}OH$ the corresponding secondary alcohol, leave no doubt as to the position of the nitroso (or oximido) group, and consequently as to the position of the chlorine atom. Whether the group NO immediately rearranges itself with the hydrogen into the group $=NOH$ or only in the formation of the nitrosomenthene, is still an open question.

Wallach[51] considers that whenever the group NO is added to a carbon atom connected with a hydrogen atom, a rearrangement into the group $=NOH$ takes place. Thiele[53] has recently obtained a nitrosochloride from tetramethylethylene  $\begin{matrix}H_3C\\H_3C\end{matrix}\!>\!C = C\!<\!\begin{matrix}CH_3\\CH_3\end{matrix}$. This is blue in color. In this compound there must be present a true nitroso group NO, since no hydrogen atom is present with which it can rearrange itself into the isonitroso group $=NOH$. Baeyer[54] considers the formation of a blue nitrosochloride from terpinolene as proof of a double linkage in this compound like this  . Recently Tilden and Forster[52] have shown that a number of so-called nitrosochlorides are oximido derivatives. They call attention to the fact that a blue color appears to be characteristic of true mononitroso-compounds and consider that the blue color produced by the action of nitrosylchloride or of nitrous acid upon unsaturated bodies is probably due to the formation of a nitroso-compound as a first step in the process.

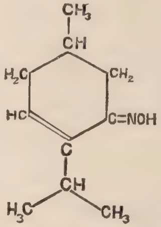
The assumption of an oximido group in the menthene nitrosochloride may therefore not be out of place until its presence has been disproved.

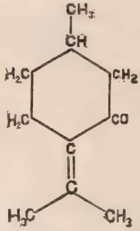
Markownikow[48] considers that when a body *y z* is added to an unsaturated compound at a comparatively low temperature, the more electro-negative group *y* takes place with the carbon atom connected with the least number of hydrogen atoms, or with that carbon atom already connected with an electro-negative element or group. It would seem therefore that nitrosylchloride follows this rule.

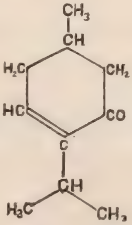
There are two possibilities as to the splitting off of hydrochloric acid from the nitrosochloride in the formation of nitrosomenthene. The chlorine may go out with hydrogen so as to form a double bond connecting the side chain, or so as to form a double bond in the nucleus, as



and



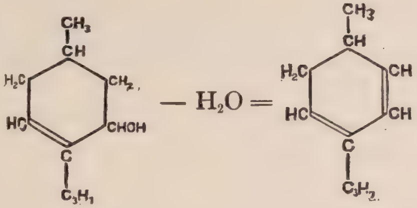
In splitting off hydriodic acid from the tertiary menthyliodide, Baeyer[49] found it impossible to obtain a hydrocarbon with the double bond connecting the side chain, ordinary menthene resulting every time. The elimination of hydrogen chloride from the nitrosochloride may be expected to occur in an analogous manner. Semmler[14] has shown that pulegone, a ketone contained in the oils of mentha pulegium[36] and of hedeoma pulegioides[50] has the constitution  If therefore the hydrogen-chloride were eliminated so as to form a double bond connecting the side chain, the ketone obtained by the hydrolysis of "nitrosomenthene" ought to be identical with pulegone. This is, however, not the case, and the double bond must be assumed as being in the nucleus. The ketone is consequently the

Δ[1] terpen–3–one  the oxime of which is the "nitrosomenthene."

The alcohol $C_{10}H_{18}O$ obtained from the amido-compound $C_{10}H_{17}NH_2$

resulting upon reduction of isonitrosomenthene is then the $\triangle^4$ terpen-3-ol and is the same as that to be expected upon reduction of the ketone.

Upon dehydration the alcohol may be expected to yield a terpene (terpadiene) in this manner:



It is this formula which Baeyer[55] assigns to the synthetic "terpene" (terpadiene) obtained by him from methyl-isopropylchinit. The same hydrocarbon might be expected by splitting off hydrobromic acid from menthene dibromide. A terpene has been obtained in this manner by Berkenheim.[39] Experiments undertaken in this laboratory have yielded a "terpene" $C_{10}H_{16}$ in the same manner. Its odor reminds strongly of that of phellandrene, and upon treatment with nitrous acid it yielded a very small quantity of a nitrosite, showing at first a melting point of 87°, but after repeated precipitation from a chloroformic solution by means of ether, it melted at 115°–116°. Berkenheim describes his compound as having a limonene odor, and was unable to obtain a crystalline addition product.

Whether this hydrocarbon is a mixture of two or more terpenes, future experiments must decide. The yield of nitrosite is so very small that a homogeneous compound can hardly be expected.

If the dehydration of the alcohol $C_{10}H_{18}O$ proves successful, a comparison of the hydrocarbon obtained with that from menthene dibromide will be made.

NOTES AND REFERENCES.

[1] Ber. d. d. chem. Ges., *27*, 436.
[2] Ann. d. Chem., *277*, 105.
[3] Ber. d. d. chem. Ges., *26*, 824.
[4] Beilstein (3te Auf.), Bd. II., p. 16.
[5] Ber. d. d. chem. Ges., *25*, 688.
[6] Ibidem, *26*, 2267.
[7] Ann. d. Chem., *275*, 130.
[8] Ibidem, *277*, 112.
[9] Ber. d. d. chem. Ges., *26*, 2558.
[10] Ibidem, *27*, 814.
[11] Ann. d. Chem., *277*, 149.
[12] Ibidem, *277*, 122 and p. 110.
[13] Ber. d. d. chem. Ges., *27*, 895.

[14] Ibidem, *25*, 3519.

[15] Ann. d. Chem., *258*, 335, and *257*, 174.

[16] Ber. d. d. chem. Ges., *26*, 2558, and *26*, 2861.

[17] Ann. d. Chem., *253*, 256.

[18] Ibidem, *268*, 223; *259*, 312.

[19] An unsaturated oxide of the formula $C_{10}H_{16}O$ has also been obtained by Wallach, by the oxidation of dihydrocarveol with alkaline permanganate solution. Ann., *277*, 152.

[20] Beilstein (3te Auf.), Bd. II., p. 21.

[21] Richter's Organic Chem., p. 1004.

[22] Roscoe and Schorlemmer, Vol. III., Part V., p. 471.

[23] Ann. d. Chem., *120*, 350; *130*, 176.

[24] Jour. Chem. Soc., *39*, 77.

[25] Ann. d. Chem., *250*, 325.

[26] Jour. Chem. Soc., *29*, 2.

[27] Ber. d. d. chem. Ges., *24*, 3374.

[28] Brühl identifies the i-cymene by means of an elementary analysis and its boiling point.

Menthol oxidized with anhydrous copper sulphate in a closed tube in the manner described by Brühl, yielding an oil distilling completely between 171° and 172° at a pressure of 734 Mm. It had the characteristic odor of i-cymene.

Oxidized with alkaline permanganate solution, it yielded an acid which, when recrystallized from alcohol, showed the melting point of p-oxyisopropylbenzoic acid, m. p. 156–157°.

[29] Ber. d. d. chem. Ges., *21*, 459.

[30] Chem. News, *44*, 283.

[31] Mehrländer—Inaugural Dissertation, Leipsig, 1888.

[32] Compt. rend., *107*, 107.

[33] Ann. chim. et phys. (6), 7, 453.

[34] Jour. Chem. Soc., Vol. *41*, 49.

[35] Ladenburg, Vol. *11*, p. 179.

[36] Ann. d. Chem., *262*, 25.

[37] Ibidem, *276*, 296.

[38] Ber. d. d. chem. Ges., *26*, 2267.

[39] Ibidem, *25*, 688.

[40] For a review of the literature on menthol and derivatives up to the year 1892, see Proc. Amer. Pharm. Ass., 1892, p. 273.

[41] Proc. Am. Pharm. Ass., 1892, p. 273.

[42] Ibidem, 1893, p. 185.

[43] Ber. d. d. chem. Ges., *26*, 2561.

[44] Ibidem, *25*, 143.

[45] The acid mother liquor evidently contains a large amount of nitrosochloride which cannot be separated in a solid form.

[46] Ber. d. d. chem., Ges., *22*, 912.

[47] In the same manner nitrosopinene, which has been considered not an oxime and

which is very stable towards sulphuric acid, is readily hydrolized by means of hydrochloric acid, hydroxylamine being formed together with an oxygenated oil.

[48] Beilstein (3te Auf.), Bd. I., p. 94.

[49] Ber. d. d. chem. Ges., *26*, 2269.

[50] Proc. Wis. Pharm. Ass., 1893, p. 51.

[51] Ber. d. d. chem. Ges., *24*, 1457.

[52] Jour. Chem. Soc., *65*, 324.

[53] Ber. d. d. chem. Ges., *27*, 454.

[54] Ibidem, *27*, 436.

[55] Ibidem, *26*, 233; *27*, 454.

THE USE OF ISOBUTYLIC ALCOHOL FOR THE DETECTION OF MORPHIN AND CODEIN.

BY J. B. NAGELVOORT.

I.

The introduction to this subject may be very brief. From the frequent inquiries the writer has received in the course of a year for a method as given below, it seems not to be a superfluous task to review, condense and elaborate the better and the less well-known details of methods whereby the dispensing physician and the druggist in the practice of his daily life can prove the presence of morphin, beyond a doubt, to the satisfaction of an expert analyst or for his own satisfaction as well.

Every candid friend of our profession will agree with me that here is a moral duty to perform. It is a daily occurrence that we have a suspicion of the presence of morphin in patent medicines of different character, and the general sentiment imposes an obligation upon every one who is under favorable conditions and has the resources and the disposition for "work," to let the community have the benefit of it.

The literature on morphin determinations is far and widely dispersed; some of it is broadly treated; some information is very shallow, much is disappointing to the student, since it leaves too many mooted questions unsettled.

Amylic alcohol used to be considered valuable for the detection of morphin, but, as every one knows, this liquid is very offensive.

I have done entirely away with this bad-smelling, headache- and cough-producing amylic alcohol, by the systematic introduction of isobutylic alcohol, a member of the same series of higher alcohols, which is much more pleasant to handle.

Three or four years ago isobutylic alcohol was recommended in the *Chemiker Zeitung* for this purpose. But I have not been able to find any results, in literature, of its application; I have carefully searched the Abstracts of the Journal of the Chem. Soc.

II.

Detection of morphin in pharmaceutical preparations, patent medicines and similar compounds, cough syrups, emulsions, pills, etc. Process A.

a. If the volume under examination is bulky, or there is much of it, take 250 C.c., acidulate with HCl and transfer the acid mixture to a dialyzer, which is to be examined previously, to see that there can be no loss of a substance which could not be replaced. Keep one-third of the original substance back. Submit the substance under examination to dialysis for about 24 hours.

b. Evaporate the clear, dialyzed fluid on a water bath to a minimum. Take a part of this ($\frac{1}{10}$) and add it to a solution of 0.1 Gm. KIO_3, and five drops acetic acid in five C.c. of water. Warm it on a water-bath. If a reduction of iodine takes place, that is, if the fluid becomes brown, add a few drops of 10 per cent. ammonia water. This decolorizes the brown mixture, *if morphin is not present.* If one has to be economical with the fluid to be examined for morphin, slips of unsized paper can be moistened repeatedly with it, dried every time, and the KIO_3 solution applied to them. It is an indication of the presence of morphin if the brown color remains.

c. Transfer the balance of the dialyzed fluid to a separator; warm to 60° or 75°. Add an equal volume isobutylic alcohol to it; make alkaline with q. s. of 10 per cent. of ammonia water (verify alkalinity with litmus paper). Agitate five minutes and keep it warm. Reject the watery fluid (the lower layer in a separator). It is necessary, in some complicated mixtures, to wash the isobutylic alcohol with a small quantity of water, at the normal temperature, and reject this also.

d. Agitate the isobutylic alcohol three times, with successive portions (10, 10, 5 C.c.) of 5 per cent. H_2SO_4, removing each portion separately to another separator. Prove excess of acid by litmus paper.

e. To the separated acid water add an equal volume isobutylic alcohol; warm to 60°–75°; make alkaline with q. s. of 10 per cent. ammonia water; prove alkalinity with litmus paper. Agitate the warm fluid continuously for five minutes.

f. Separate isobutylic alcohol. Evaporate six equal portions of it in small beakers, previously scrupulously cleaned. Evaporate also a portion of the isobutylic alcohol which is in use, to dryness. Verify if the isobutylic alcohol leaves a residue. If so, it is to be rejected and other isobutylic alcohol used in this process.

g. Dissolve residue No. 1 in a few drops of water, acidulated with acetic acid; add this solution to a solution of KIO_3, as described under b.

Dissolve residue No. 2 in two drops of conc. H_2SO_4; warm one-half hour on the water bath; spread a drop of the acid in a thin film on a porcelain lid; touch it with a pointed glass rod moistened with HNO_3; violet and blood-red color reactions show the presence of morphin; if the mixture discolors, *no* morphin is present.

Dilute a drop of a concentrated Fe_2Cl_6 solution, which must be free from uncombined HCl, with three drops of water. Add one drop of this dilution to residue No. 3; morphin is present if a blue color reaction shows itself.

Submit residue No. 4 to contact with a freshly prepared mixture of 0.02 Gm. ammonium molybdate, triturated to a fine powder, add five drops of concentrated sulphuric acid. A lilac color shows the presence of morphin. *Slowly* the mixture changes to a permanent blue color; this is *not* a morphin reaction, however, but a decomposition product of the ammonium molybdate.

Residue No. 5 must be submitted to contact with a freshly prepared mixture of 0.02 Gm. titanic acid and five drops of concentrated sulphuric acid. A reddish brown color, constant for an hour with 0.0001 Gm. of morphin, proves its presence eventually.

Residue No. 6. Pure bismuth subnitrate, taken instead of titanic acid, gives a *black* color reaction, when a comparatively large quantity of morphin is present. I found 0.0001 ($\frac{1}{10000}$) Gm. to cause a yellow-brown coloring of the morphin. The black spots, caused by a larger quantity of morphin, change to yellow brown stripes when a glass rod is drawn through them.

Quantitative estimations of morphin in medicines are very problematical. Morphin is sensitive enough to chemical tests, but it is not so easy to isolate it. In connection with the purpose of this paper one would like to know to what extent morphin can be added to "medicines" without detection. I have added repeatedly 0.025 Gr. to 4 fl. ounces of mixture, and found it back in parts of such estimation. Larger doses will already have been detected by their physiological effect, while smaller might be considered harmless.

Process B, for bulky volume *and* small quantities; e.g. in a cough syrup.

a. Taking as example a colorless syrup, one can add 1 C.c. of it to the KIO_3 test (see above) directly. Proceed, if the test gives indications for morphin, as follows (which procedure is to be applied to other mixtures as well):

b. Warm two-thirds of the original liquid to 60° or 75° (preserving one third), or take 1 C.c. of a cough syrup, and dilute it with water to 5 C.c. and warm this dilution. A large test-tube does very well for this purpose. Add an equal volume isobutylic alcohol and make alkaline with q. s. ammonia water 10 per cent. Prove alkalinity with litmus paper. Agitate strongly for a few minutes. Transfer the top layer of isobutylic alcohol with a pipette to another test tube.

c. Add 5 C.c. water, acidulated with H_2SO_4, to it (prove acidity) and agitate strongly for a minute. Remove top layer isobutylic alcohol with a pipette. Wash acid water twice with petroleum ether. Take petroleum ether away with a pipette (benzine is equally good, morphin being equally insoluble in either).

d. Warm the acid water in a water bath; add an equal volume isobutylic alcohol to it, and make alkaline with q. s. 10 per cent. ammonia water. (prove alkalinity by immersing a small strip of litmus paper in the fluid). Agitate strongly for one minute.

e. Remove the alkaline top layer of isobutylic alcohol with a pipette and evaporate equal portions of it in clean beakers, as described above. Proceed further as directed there—Process A.

Repeat with a larger quantity of original fluid, when all the reactions are not obtained successfully; the Fe_2Cl_6 test may fail, while the KIO_3, the ammonium sulphomolybdate and the titanic acid tests appear as evidence for morphin.

III.

Proof that it is a morphin pill or morphin tablet triturate with which we have to deal.

Take one of the sugar-coated pills, as they are sold, warranted to contain ⅛ of a grain morphin sulphate, and dissolve it in five (5) C.c. of water, in a test tube. Add five (5) C.c. isobutylic alcohol to it; put the test tube on a warm place; add a few drops 10 per cent. ammonia water to the solution, when warm, and agitate strongly during one minute. Allow the isobutylic alcohol to separate, take it up with a pipette when it is separated clearly and transfer it to a clean beaker. Evaporate it to dryness. Dissolve the residue in six (6) C.c. absolute alcohol.

I. Evaporate one (1) C.c. of this alcoholic solution on a porcelain lid to dryness. (Porcelain lids are matchless utensils for color reactions; their immaculate white surface offers the best obtainable background for color-reactions.) Dilute one drop of a concentrated Fe_2Cl_6 solution with four (4) drops of water; add one drop of this diluted ferric chloride solution to the invisible residue of the evaporation; immediately a green-blue color will appear if the pill was a morphin pill.

II. Evaporate another C.c. to dryness on a porcelain lid, add to the residue two drops concentrated H_2SO_4 and warm it, on a water bath, for an hour. Usually the sulphuric acid has become brown thereby. Spread the acid out on the lid, in as thin a film as possible; draw through this film a glass rod of the size of a match, previously moistened with concentrated HNO_3. The appearance of a blood-red color is another evidence of the presence of morphin.

III. Evaporate another C.c. of the alcoholic solution to dryness, this time in a beaker; add one (1) C.c. diluted acetic acid to the residue and follow Process *A*, *g*.

Since the above tests prove the presence of morphin in a pill beyond a doubt, one can continue his research with isobutylic alcohol on a codein pill.

Let us suppose it was to be decided that morphin was openly or clandestinely added to a pill, with or without notice.

It is now under consideration if CODEIN is present.

Take as before ⅛ of a grain sugar-coated pill, sold for a codein pill. Treat as above, III.

Dissolve residue No. 1 in one drop concentrated H_2SO_4 and stir this solution with a small glass rod, previously moistened with concentrated HNO_3. A *green* color reaction will appear, even in this residue of a ⅙ or a ⅛ of a grain pill, if codein is present.

Dissolve residue No. 2 in a drop concentrated HNO_3; it will color *yellow*, codein being present; distinctly to be seen in a ⅙ or a ⅛ of a grain pill.

Dissolve residue No. 3 in one (1) drop conc. H_2SO_4, draw a very small glass rod, previously moistened with the same diluted ferric chloride solution as used above for morphin, through it, and warm on the water bath for a few minutes. Green to violet colors appear when codein is present in the same small proportion.

Other codein reactions are too much of a negative or a less characteristic nature to be useful in this investigation.[1] But codein is not of such a harmful nature as is morphin, neither is its addition to medicine, openly or clandestinely, as criminal.

Benezech stated (Pharm. Zeitung for 1892, p. 545) that malva flowers contain a coloring matter which turns green with codein, while this coloring matter is not affected by morphin. I have verified this statement and found that it makes a useful addition to our list of reactions.

I took a red Hollyhock flower (Althea rosea) (Benezech's statement did not mention any special malva), boiled it with 10 C.c. of water, and filtered.

Two drops of the purple-colored filtrate added to a solution of a ⅛ grain codein pill in two C.c. water colored this solution *green*. This green color was to be seen even after 24 hours.

The purple solution had no effect when added to a solution of a ⅛ of a grain morphin pill.

Detroit, May, 1894.

A METHOD FOR THE ESTIMATION OF MONO- AND BI-CARBONATE OF SODIUM IN COMMERCIAL BI-CARBONATE OF SODIUM.

BY W. T. WENZELL, CALIFORNIA COLLEGE OF PHARMACY, SAN FRANCISCO, CAL.

The writer takes pleasure in presenting herewith a method for the analysis of Bicarbonate of Sodium, which he originated six years ago, and which has been used with concordant results in numerous instances.

Closely following upon this process, the method of Mr. Schroetter, (Am. Journ. Ph., Dec., '88), may be mentioned here, but this does not conflict materially with the principles involved in the writer's process.

It may, however, be stated, that inasmuch as Mr. Schroetter's analytical work requires two distinct processes,—that of ignition in a combustion tube and that of an estimation of carbon dioxide in the usual way,—the writer's analysis is accomplished by a carbon dioxide determination simply, which may be considered advantageous.

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[1] Amer. J. of Pharmacy, 1892, page 572.

The process on which this analysis is based depends upon the following data:

1.) The percentage amount of carbon dioxide contained in Sodium Bicarbonate = 52.38095.

2.) The percentage amount of carbon dioxide contained in Sodium Mono-carbonate = 41.50943.

3.) The difference between the two percentage amounts of the two carbonates 52.38095 — 41.50943 = 10.87152.

4.) A factor representing one per cent. of this difference, 10.87152 ÷ 100 = .1087152.

From the foregoing amounts the following data have been proposed for formulating the analytical process:

A. = Percentage amount of CO_2 obtained by the actual analysis of the sample.

B. = Theoretical percentage of CO_2 contained in the sample, calculated as $NaHCO_3$.

C. = The difference between the respective amounts of A and B.

D. = The factor representing 1 per cent. of the difference of the amounts of CO_2 contained respectively in Na_2CO_3 and $NaHCO_3$.

E. = The percentage amount of Na_2CO_3.

F. = The percentage amount of $NaHCO_3$.

G. = The total percentage amount of mixed carbonates in the sample.

FORMULA.

A. — B. = C.
C. ÷ D. = E. (E. = Na_2CO_3.)
G. — E. = F. (F. = $NaHCO_3$.)

EXAMPLE FROM ACTUAL ANALYSIS.

A sample of Bi-carbonate of Sodium gave on analysis the following results:

Moisture	.35
NaCl	.29
Na_2SO_4	1.65
$NaHCO_3$ and Na_2CO_3 (Estimated by difference)	97.71
	100.00

The moisture was determined in a desiccator over Sulphuric Acid.

Two grams of the sample gave 1.0196 gms. = 50.98 per cent. CO_2.

The theoretical amount of CO_2 in the mixed carbonates calculated as $NaHCO_3$, $= 52.38095 \times 97.71 \div 100 = 51.18142$ per cent. CO_2.

Hence according to formula:

$$\overset{A.}{50.98} - \overset{B.}{51.18142} = \overset{C.}{.20142}$$

$$\overset{C.}{.20142} \div \overset{D.}{.1087152} = \overset{E.}{1.85} = Na_2CO_3$$

$$\overset{G.}{97.71} - \overset{E.}{1.85} = \overset{F.}{95.86} = NaHCO_3$$

RESULTS OF ANALYSIS.

$NaHCO_3$	95.86
Na_2CO_3	1.85
NaCl	.29
Na_2SO_4	1.65
H_2O	.35
	100.00

ALLIGATION IN PHARMACEUTICAL CALCULATIONS—ITS USEFULNESS AND LIMITATIONS.

BY T. D. REED, M. D., MONTREAL COLLEGE OF PHARMACY.

The necessity for the information which this kind of calculation may furnish, arises from time to time in chemical and pharmaceutical work. The arithmetical principle is ancient, and its application in pharmacy is referred to in Ure's Dictionary half a century ago, some of its limitations being also pointed out. The introduction of standardized drugs has caused some attention to be given to the subject, and we find it cropping up in journal literature and being introduced into examination papers.

The author of a student's manual makes this extraordinary claim, in reference to Alligation, in a preface dated 1892: "Its application to the uses of the pharmacist originated with the author, * * * it was first submitted to the pharmaceutical public on the debut of this work."

To establish priority here will be about as difficult as in the case of the use of any other mathematical principle.

The possibilities in application of alligation seem not to have been fully recognized in some quarters, for we find in an examination paper recently the following problem: "Required 90 ozs. of Pulv. Scammon., that will assay 62.5 per cent. resin, by the admixture of powders assaying, respectively, 75 per cent., 70 per cent., 53 per cent.; how much of each will be required?"

Now this question permits of three answers in whole ounces, thus: 18 oz. 75 per cent., 27 oz. 70 per cent., 45 oz. 53 per cent.; 1 oz., 49 oz., 40 oz.; and 35 oz., 5 oz., 50 oz.—and taking *any* quantity for any one strength, a series of fractional quantities is obtainable, so that the answers are *unlimited.* Alligation will give *an* answer in fractional quantities, and that is all it will do.

The mistake here made, we think, is in overlooking the fact that, for mixtures of more than two strengths, there cannot be a fixed answer.

In the manual before referred to, the following "Example" is given: "How many grams each of powdered opium, assaying respectively, 9, 10, 12, 16, and 18 per cent. morphine, *must* be used to make a mixture of 100 grams, that will contain 14 per cent. morphine?"

In this case, any even number given to the 9 per cent., from 42 downwards, will give a numerous series of whole numbers, so also any number from 54 downwards given to the 18 per cent., will meet the requirements, and thus a *hundred* answers may soon be produced without fractions; still the answer given in the book has all the quantities in milligrams, and not exact even then. Here are two illustrations of integral quantities; 42, 9 per cent.; 1, 10 per cent.; 2, 12 per cent.; 1, 16 per cent.; 54, 18 per cent.—2, 40, 1, 28, 29.

Evidently the little word *must*, which I have italicised, is out of place in such a question.

Another mistake is the use of the principle to make mixtures of a new specific gravity from liquids of given specific gravities. Nearly all solutions of different gravities, when mixed, vary in volume, some considerably. Alcohol and water, it is well known, also manifest condensation, so that the principle is not applicable. This was noted by Ure long ago. Dilutions to a new percentage by weight, however, may be calculated, for instance, to make a liquor of 10 per cent. by weight, from one of 25 per cent. The conditions here are 0, 10, 25, and all we have to do is to take 10 pounds, ounces, etc., of the strong, and dilute up to 25 with water.

To deal with more than two strengths, then, it can only be said that alligation will furnish *an* answer, and this will suffice in many cases. If there are conditions, such as whole ounces, and other limitations, we must have recourse to algebra, of which, however, only an elementary knowledge will be sufficient. Here is an example communicated by the writer to the "Montreal Pharmaceutical Journal:" "How shall we make 4 gallons of English laudanum (opium 10 per cent.), with samples of opium of 7½ per cent., 9 per cent., and 11½ per cent. morphia strength respectively, using whole ounces of each, and as much as possible of the weakest?" For this we have to find quantities which give 48 oz. averaging 10 per cent. Alligation will not supply the figures required. We may assume the required quantities as $a+b+c=48$, and applying the simple principles of algebra, we find 13 oz. of 7½ per cent., 8 oz. of 9 per cent., and 27 oz. of 11½ per cent., fulfil the conditions of the question.

In chemical analysis, the principle of Alligation is sometimes usefully applied, as for instance in a mixture of known weight, containing two compounds, with *only* three different elements, *e. g.*, potassium and sodium chloride, or potassium iodide and potassium chloride—the possible precipitates being one above and one below, the given precipitate. This application is noted in the early editions of Fresenius.

The powers and possibilities of numbers constitute an interesting and even fascinating study, but it must be remembered that fixed results can only flow from fixed conditions.

SOME PHARMACEUTICAL USES OF ACETONE.

BY JOSEPH E. MORRISON.

The use of acetone in pharmacy will be limited on account of its disagreeable odor and taste, its comparatively restricted range of solvent power as compared with alcohol or water, and its higher price, which at present is 50 to 60 cents per pound, while alcohol costs considerably less.

The solvent action of acetone is shown principally on resins, tannins and some active principles. Geo. M. Beringer some years ago, in a paper which appeared in the American Journal of Pharmacy, gave the results of a series of experiments on the preparation of oleo-resins with this solvent, some of which the writer has repeated, the results agreeing with those obtained by him.

The only other lines in which acetone may be useful are the resins, collodions, and a few liniments, since for the reasons given above it cannot be used in tinctures or fluid extracts.

The following are some of the preparations which we have made satisfactorily with acetone:

Resina Jalapæ.—100 grams of jalap root in No. 40 powder, moistened with acetone, packed in percolator and allowed to macerate 48 hours, then percolated 250 C.c., from which the acetone was distilled on water bath, syrupy residue poured into water, and the separated resin well washed and dried. The resulting resin weighed 14.66 grams and was entirely soluble in alcohol, about 10 per cent. soluble in ether 0.725 sp. gr.

Resina Podophylli.—100 grams mandrake root treated by the official process yielded 5.6 per cent. of resin.

Resina Scammonii.—100 grams of scammony dissolved in 200 C.c. acetone without the aid of heat, the acetone was then distilled off, and the syrupy liquid poured into water, allowed to settle and the resulting resin washed and dried; yield 94.8 grams.

These resins correspond in characteristics with the official preparations.

Collodium.—

Pyroxylin	30 Gm.
Acetone	1000 Gm.

Add pyroxylin in small portions to the acetone, stirring constantly. The pyroxylin dissolves almost immediately, forming a clear solution with a slight yellowish tinge, which is ready for use at once.

Collodium Cantharidatum.—

Cantharides	60 Gm.
Acetone	100 C.c.
Castor oil	3 Gm.
Canada balsam	5 Gm.
Pyroxylin	3 Gm.

Moisten cantharides with acetone, pack in percolator, and percolate 100 C.c., to which add the castor oil, balsam and pyroxylin. On adding the balsam a cloudiness is produced, due to its partial in solubility in acetone

Collodium Stypticum.—

Tannic acid	20 Gm.
Acetone	30 C.c.
Acetone collodion	to make 100 C.c.

Dissolve tannic acid in acetone, and add the collodion to make 100 C.c.

Liquor Epispasticus P. B.—

Cantharides	1 oz.
Acetone to make	5 oz.

Moisten cantharides with acetone, pack in percolator, macerate 48 hours and percolate 5 oz.

These preparations have been found as efficient as those made by the official methods.

Of the liniments only two can be prepared with acetone, namely, liniment of soft soap and compound liniment of mustard, in which it may used to replace the alcohol, the only other alcoholic liniment being liniment of soap, but as castile soap is insoluble in acetone this menstruum cannot replace that directed in the Pharmacopœia.

Montreal, Canada, August, 1894.

THE TESTING FOR "*ARSENIC*" OF THE U. S. P.

BY J. B. NAGELVOORT.

The question at issue in this paper is far greater than when the presence of *Arsenic* in the glycerin of our pharmacies was under consideration elsewhere. (Bull. o. Pharm., April, 1894.)

1st. It matters very little if the U. S. P. varies the sanctioned method of Bettendorf and prescribes under *Sodii phosphas*, page 364:

"If 1 Gm. of the powdered salt be shaken with 3 C.c. of stannous chloride T. S., then a small piece of pure tin-foil added and a gentle heat applied, no brown coloration should appear within 15 minutes." (Limit of *arsenic*.) This variation of Bettendorf's method involves so much risk, that it will not likely be adopted.

2d. Of more consequence is it, to read on page 72, under the heading, "*Calcii hypophosphis:*"

"If 1 Gm. of the salt be dissolved in 20 C.c. of water . . . . . no precipitate should be produced in this solution by . . . . an equal volume of hydrogen sulphide" (absence of *arsenic*).

Hydrogen sulphide does not produce a precipitate in a watery solution of an arsenous acid; only after the solution is made strongly acid.

I must come to the conclusion that the ; in the quoted paragraph is not a typographical error, since the construction of the whole sentence shows it to be needed there. The Pharmacopœia Committee knows this very well. But the druggist does not. My remark is not intended for it, but as a guide for the average reader.

3d. Of a grave character, and out of place, is the involuntary "*Arsenic*" reaction on page 73, where we read, under *Calcii phosphas precipitatus.*

"From another portion Ammon. molybdate T. S. precipitates yellow ammonium phosphomolybdate; the reaction is accelerated *by a gentle heat.*"

I protest respectfully against this reaction. It is a dangerous practice to apply a gentle heat. The gentle heat changes the phosphoric acid reaction into an "*Arsenic*" reaction. See Fresenius, Qualit. Analys., XV Ed., p. 243.

4th. *Potasii et sodii tartras*, page 320.

The *aqueous* solution should not be rendered turbid by . . . . . an equal volume of hydrogen sulphide, either *before* . . . . acidulation . . . . . *absence of arsenic.*

5th. And of very great importance is it to read, on page 42, under the heading, "*Antimonii et potassii tartras:*"

"If 1 Gm. of the salt be dissolved, with the aid of heat, in hydrochloric acid, and to the solution 1 C.c. of stannous chloride T. S. be added, . . . together with a small piece of pure tin-foil, no turbidity or coloration should ensue, within one hour" (limit of *arsenic*).

Let us be as scrupulous in judgment as our analytical balances are. Here lies concealed a pitfall for fatal errors. Upon these four harmless looking lines a whole chapter of analytical comment could be written.*

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* The Pharmacopœia assumes that the pharmacist can run before he has learned to walk. Did not the Research Committee B. excuse itself, in a very unconspicuous place, between the lines of an article devoted to another report, that "by an unfortunate misunderstanding of the transcriber, tin-foil was directed to be added in reactions on arsenic in tartar emetic and in bismuth subnitrate?"

This paper (of mine) was in hands of Prof. L. E. Sayre before the first report of said Committee reached the interested professional reader. [Said report appeared *in a foreign language* in the Pharm. Rundschau for July, 1894.]

Proof-reading (of my paper) enables me to ask permission, as a veteran in the profession, to protest before the American Pharmaceutical Association earnestly, manly and becomingly against the above excuse.

I have seen, in my professional career, many serious consequences from an imperfect understanding of just such questions, serious for life and liberty.

This unfortunate misunderstanding of the combined authors of the U. S. P. will bring

There is a danger that too much importance be attached to a slight browning of the fluid. I do not think that the large majority of the people who use the U. S. P., have yet learned how infinitesimally small the amount of "*arsenic*" is, that will be detected by Bettendorf's reaction.

Under "List of Reagents," the U. S. P. says, page 466 :*

"An equal volume of a saturated solution of freshly prepared stannous chloride, in hydrochloric acid, together with a small piece of pure tin-foil. See Stannous chloride, No. 108."

Turning to page 480, No. 108, we read :

"Remove and drain the crystals of stannous chloride, dissolve them in 10 parts of water, and preserve the solution, in well stoppered bottles, into each of which a piece of pure tin-foil has previously been introduced.

"FOR BETTENDORF'S TEST, PURE CONCENTRATED HYDROCHLORIC ACID IS SATURATED WITH THE FRESHLY PREPARED CRYSTALS."

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for ten years to come great disturbances among judges, juries, druggists, physicians, dealers in drugs and consumers.

It ought to have been made known to every purchaser of the seventh edition of the book and to the profession at large *under its proper heading*. The Committee, discovering the "unfortunate addition to the text," ought not to have rested a day in clearing itself.

I am not personal in my philippics. The reader will see this when he turns to page 385 of the Archiv. der Pharmacie for 1889 for my arguments:

"Ueber eine Vergiftung...... Kompliziert durch Anwesenheit von Spuren von Arsen." Von Prof. Brunner.

It surpasses my understanding that said Committee B. devoted, *in the first place*, its time and the space of our journals for researches as to the sensitiveness of Bettendorf's test on arsenic. The country cannot expect that its Committee has read every laboratory note on analytical chemistry that ever was written. The sensitiveness of Bettendorf's test on arsenic is, however, to be found in Dragendorff's Ermittelung v. Giften, 1888, page 396. Writer of this paper published in the Bull. o. Pharm., 1889, how small an amount of arsenic could be found in bismuth subnitrate with Bettendorf's test, and the Pharm. Zeitung for 1891 settled also the question, on pages 167–168.

Let us try to lessen the mischief which the "*Testing for Arsenic of the U. S. P.*" has wrought.

* How can I keep, ready, a watery solution of crystals of stannous chloride, *and* saturate HCl with freshly prepared crystals, for Bettendorf's test (page 480), *and* follow the direction on page 466, add an equal volume of freshly prepared stannous chloride in pure concentrated HCl, etc.?

If a variation of the test is made, as follows, the addition of tin-foil will cause a black precipitate in an acid solution of tartras emeticus, *which is not arsenic alone, but also antimony*.

Dissolve 1 Gm. tartar emetic in five C.c. concentrated HCl. Make two solutions.

To solution No. 1 add 3 C.c. of a freshly prepared concentrated watery solution of stannous chloride *and* 0.1 Gm. tin-foil.

To solution No. 2 add 3 C.c. of the same freshly prepared concentrated watery solution of stannous chloride. *No tin-foil.*

Wash the black precipitate and treat it further as prescribed above, and the results will be a *strong reaction of Antimony.*

Metallic tin added to a solution of stannous chloride and hydrochloric acid will cause a precipitate of antimony, in the test of the U. S. P. for "Arsenic" in Antimonii et potassii tartras.

The reader is invited to boil two (2) Gm. tin with ten (10) C.c. concentrated hydrochloric acid, and to evaporate to dryness. (We are making fresh stannous chloride solution now). Add five (5) C.c. concentrated hydrochloric acid to the white salty residue, in which some granulated tin is left; filter the solution of the white, dried salt, through asbestos; use two (2) C.c. of the filtrate for a solution of one (1) Gm. antimon. et potass. tartr. in five (5) C.c. concentrated hydrochloric acid (no heat is needed; it dissolves in the acid at the summer temperature of the room) *without tin-foil*, and two (2) C.c. of the filtrate for a solution of one (1) Gm. antimon. et potass. tartras, *to which you will add a piece of tin-foil of about 0.1 Gm. (100 Mgm.).* Place your two test-tubes next to each other, so that time of action, influence of light, height of column, etc., etc., are all alike, for both tests.

If your antimony and potassium tartrate is pure, or nearly so, the tube without tin-foil will show only a light brown coloration, or none at all. In the tube *with the additional piece of tin-foil* you will notice a black precipitate. Collect this precipitate, by removing the fluid standing over it, washing it in the same test-tube, and dissolving it in HNO_3 and HCl, whereby the chemist of experience will immediately notice that there is an indication of the presence of antimony, by the forming of the white insoluble metantimonic acid, when the black precipitate comes in contact with the HNO_3. Notice the yellow color of the solution of the black precipitate in the two acids—another indication for antimony (or for bismuth). Dilute this acid solution largely, and add to a part of it H_2S or $NH_4S.HS$. The highly red-colored precipitate will convince you that "*the addition of tin-foil to a freshly prepared solution of stannous chloride in hydrochloric acid has precipitated antimony as well as arsenic, whenever both are present*, as is the case (or might be) in *antimony and potassium tartrate.*

I recommend to make and to apply Bettendorf's test as I have done for years and described above, without additional tin-foil, to an acid solution of antimony and potassium tartrate, and freshly prepared stannous chloride.

In case the tartar emetic is found by Bettendorf's test not to be free from *arsenic*, it is wise not to rely upon one test. Where the method of separating *arsenic* and *antimony* mirrors by H_2S is found to be too elaborate, I recommend this process:

Triturate 10 Gm. tartar emetic with 40 Gm. sodium nitrate, and introduce this mixture by small quantities at a time into a crucible; ignite it; exhaust the white salty residue with water, acidulate with HNO_3; filter; concentrate the clear filtrate to a minimum; add q. s. $AgNO_3$ test solution; overlay the fluid in a test-tube carefully with 10 per cent. ammonia water. A yellow ring of $AgAsO_3$ will appear at the line of contact of the two fluids, if arsenic is present. Apothecary Van Ankum could thus detect 0.0005 in 10 (ten) Gm. tartar emetic. *The filtrate does not contain an antimonium salt.*

Detroit, June 15th, 1894.

THE OPIUM POPPY IN NORTH CAROLINA.

BY GERALD M'CARTHY, BOTANIST, NORTH CAROLINA AGL. EXPERIMENT STATION.

The opium of commerce is obtained chiefly from *Papaver somniferum.* There are two varieties of this, viz., var. *glabrum* and var. *album.* Some botanists make the var. *glabrum* a species. *Glabrum* is the variety or species most largely grown in Turkey, which country supplies the best opium in commerce, and from which the larger part of the opium used in the United States is drawn. The poppy generally cultivated in Persia, China, and India is the variety *album.* Egyptian poppy is a deteriorated strain of the Turkish.

The poppy is an annual herbaceous plant producing large, showy and very short-lived flowers. The flowers are followed by the top-shaped or oval capsule, which has a number of ridges--the stigmas or pistil—on top. The capsules at maturity are well filled with very small seeds, which are white or black according to the variety. The white seeded varieties are considered best for opium and the black seeded for oil, but both kinds produce opium and oil.

The poppy is a fairly hardy plant and can be successfully cultivated on a large scale as an ordinary field crop wherever Indian corn is grown, or the vine cultivated. The opium of commerce is obtained by incising the unripe capsule, usually in the evening, and the next morning collecting the hardened "tears" by scraping off the capsule. The capsule is usually incised when about three-quarters full grown.

In countries where the weather is not steadily dry during the opium harvest, the incision is usually made in the morning and the exuded juice caught as it flows, or wiped off with the finger into a suitable vessel. In the latter case the fresh juice is usually evaporated at once by artificial heat and afterwards worked by hand into balls, cubes or cakes and covered with the dried petals of the poppy flower, or with the leaves of the poppy or grape vine. The amount of crude opium produced per acre I am unable to state, but in India where the drug is a government monopoly and all cultivators are required to sell their produce to the government at a price fixed by the latter, usually about $1.00 per pound, the crop is found about ten times as profitable to the grower as wheat is.

During the recent war between the States opium was grown in North Carolina sufficient to supply the local demand for the drug—the foreign supply being cut off by the blockade. No trouble was experienced in producing a satisfactory sample and some advance was made in devising special tools to work the plant. But with the cessation of hostilities, reopening of ports, and the turbulent times that succeeded the close of the war, the nascent industry ceased to exist. I have no doubt but that the industry can be revived and that the central and Piedmont districts, or wherever good tobacco is now grown, can produce opium equal to the best imported from Turkey. As conducted at present in the backward countries of the Orient, the work is altogether done by hand and hence is very costly. But if the culture of this crop is established among us, improved processes and tools will not be long lacking, and the cost of production thereby reduced.

The black seeded popyy is largely grown in France and Germany for oil alone, this being largely used to adulterate olive oil. The cake or pomace left after extracting the oil by pressure is utilized as cattle food. It is quite wholesome. The alkaloid principles are found only in the juice of the immature capsule and to a small degree in the juice of the leaves. When propely conducted the scarification of the capsule to obtain crude opium does not interfere with maturing the seed within the capsule, and hence a double crop—opium and oil—may be obtained from the same plant and in the same season.

The scarification of the capsules and collection of the exuded juice requires a great amount of labor, and as this work must be done at the right moment and within a very brief space of time, it requires abundance of well disciplined hands. This and not climatic conditions is the main obstacle to introducing this crop among us. If the capsules themselves could be collected and the opium recovered in a wholesale way by chemical processes, this obstacle would be largely overcome. Cannot the pharmacists of the United States devise some such process?

It is likely that the North Carolina Agricultural Experiment Station will grow and make a practical test of this plant in 1895 with a view of determining the product per acre, cost and profit of growing the crop, quality, etc. We shall be pleased to report results to the Association of American Pharmacists, or to a committee they may appoint to consider this subject.

"DO THE SO-CALLED ELEGANT PREPARATIONS OF COD LIVER OIL, FROM WHICH THE OIL HAS BEEN REMOVED, POSSESS THERAPEUTIC VALUE?"

BY F. E. STEWART, M. D., PH. G.

To begin with, I take exception to the question itself for two reasons: First, because it pertains strictly to the domain of therapeutics, rather than that of pharmacy. Second, because it is not sufficiently specific in that a preparation of cod liver oil might possess great therapeutic value after the fatty substance is removed, provided it contains other valuable therapeutic agents, such as iron, potassium iodide, etc. Again the word "*removed*" is misapplied, for it necessarily involves the supposition that the preparation must first have contained the oil, whereas I know of no preparation of cod liver oil, for which the claim is made, that the oil has been "removed." The propounder of the question probably intended to ask whether a preparation purporting to be made from the "active principles" of cod liver oil possesses therapeutic value? This question I will now endeavor to answer.

The process of determining the therapeutic value of an alleged remedial agent is one of collecting evidence. Evidence regarding the therapeutic value of drugs can be divided into two classes: First, evidence from unscientific sources, which may be said to consist largely of reports from Indian medicine-men, quacks, and old women, whose evidence is not unworthy of consideration, in view of the fact that their experiments have paved the way for the scientific use of nearly every medicinal plant of importance.

The second class of evidence is that obtained from scientific sources, which may be subdivided into two classes, viz.: the experience of one competent observer in a reasonable number of cases, and secondly the combined experience of numerous competent observers. It is the office of the authors of medical text books, and of the Committee for Revising the United States Pharmacopœia, to collect evidence from all these sources, and to properly weigh it before publishing. Their compilation of evidence constitutes the scientific literature of medicine, which is necessarily full of contradictions because different authors disagree (among themselves). It can be readily perceived that no *single* observer, no matter how competent, can settle the question as to whether a drug or preparation possesses marked therapeutic value. Indeed, there is often as much difference of opinion as to the merits of a medicinal preparation between physicians of high class, professedly belonging to the same school, as there is between members of different schools. All, therefore, that I undertake to do in this connection is to submit such evidence as I have been able to collect regarding the therapeutic value of the preparations of cod liver oil referred to, for the purpose of showing that they are of *some* therapeutic value, leaving the problem of their true value in comparison with cod liver oil as a whole to be solved by careful clinical tests hereafter by the profession at large.

Preparations claiming to be made from the alleged active principles found in cod liver oil may be divided into two great classes: (1) Those made from the active principles derived from the oil itself, (2) Those containing one or more principles akin to those found in the oil, but not made directly from the oil itself. An illustration of the latter class of preparations is provided by one article for which the manufacturers make the claim (among others) that it represents the curative principles of cod liver oil, but which is nevertheless said to contain as its sole representative of these principles or curative agents, iodine in solution. A preparation of this type may possibly possess virtue, but is certainly not entitled to rank either with cod liver oil, or with its active principles.

It is the preparations first named, viz.: those actually made from the alleged active principles of cod liver oil, to which I think it desirable to refer in detail.

According to the text books, cod liver oil's past reputation was based upon its being an easily assimilated fat. According to Bartholow it is peculiarly fitted to form the molecular basis of the chyle. Several authorities have noted the fact that it contains iodine in addition to other principles; but it has been left to more modern investigators to accurately determine the true chemical composition of cod liver oil. We have now the benefit of the researches of Messrs. Gautier & Mourgues, French scientists, whose high standing is assured. They are recognized as authorities in Europe, and no one has ever ventured to question their integrity, or the value of their methods. The "Lancet," an English medical journal, which stands as high in England, if not higher, than any medical or pharmaceutical journal published in this country, says in its July number, 1894: "Recent investigation has led to the isolation of several distinct bodies in cod liver oil, notably amongst which are the alkaloids aselline and morrhuine, in association probably with morrhuic, formic, butyric, and phosphoric acids. These principles have been tested clinically, and the results formed the subject of an exhaustive report by Messrs. Gautier & Mourgues, in the 'Journal de Pharmacie,' March, 1890, who concluded that the combined active principles of cod liver oil act as powerful stimulants of nutrition and assimilation, and show definitely the nature of the principles to which the oil to some extent owes its valuable medicinal properties." Messrs. Gautier & Mourgues have given us a list of these active principles of cod liver oil, and have also furnished evidence to prove that these principles have peculiar physiological activities, and great therapeutic value. What they say must be accepted as part of the evidence in summing up the case in regard to the therapeutic value of the principles contained in cod liver oil.

The "Medical Magazine," an English periodical of June, 1894, says: "Ever since the value of cod liver oil in the treatment of wasting and debilitating diseases was discovered, efforts have been made to discover the exact constituents which are valuable, and, if possible, to separate them from the unpleasant accompaniments of the fishy taste and the greasy character. Much has been done in the direction of rendering the oil more palatable and more digestible. A new departure, however, was made in the attempt to find out by experiment whether the value of the preparation depended at all on its fatty nature. Physicians and experimenters of great experience and skill seem to have satisfied themselves that the fatty matters alone were of but secondary importance, and that the almost specific effect of cod liver oil on tuberculous conditions was due to other constituents.

"The Medical Times and Hospital Gazette" of June 2, 1894, says:

"One would almost say that it is a subject which has been so thoroughly exhausted as to preclude the possibility of any fresh developments, yet if we will follow the history of all important discoveries we will find that they have almost invariably been associated with substances previously supposed to have been 'exhausted.' It is also a fact, and possibly a matter of regret, that every important step in the progress of therapeutics has been met with doubt, suspicion, and even ridicule, ultimately to be changed to the most enthusiastic support. This was true of cinchona bark, opium, coal-tar, and many others, which yielded to the penetrating eye of science many and valuable active principles now in common use. The advanced studies of eminent French investigators, pursued unremittingly for many years past, in the face of apparent defeat, have at last borne fruit in the determination and isolation of the active principles of cod liver oil. MM. Gautier, Mourgues, and Bouillot, of Paris, have conclusively proved, both chemically and clinically, that the fatty matter of oleum morrhuæ has for many years received credit for the work actually performed by the active principles, and Lafarge and Germain See have also contributed profusely to the subject."

The "Bristol Medico-Chirurgical Journal" for June, 1894 says: "It has long been thought that the active principle of cod-liver oil was the oil itself, but recently the practice of giving certain solid extracts from the oil has come into vogue; and there is much clinical evidence in favor of the utility of such preparations. Various physiological experiments tend to show that cod-liver oil is a re-constituent of the tissues through its richness in phosphates, phospho-glyceric acid, and organically combined phosphorus. Bromine and iodine also contribute; but it is presumed that the principal medicinal value of the oil may be due to such substances as butylamine, amylamine, morrhuine and morrhuic acid. Presuming that cod liver oil owes its value as a medicine to the active principles which may be separated from the oil itself, we have good grounds for encouraging the use of capsules containing these separated products or fluids which contain them in solution."

Finally the United States Dispensatory (Seventeenth Edition, 1894, p. 948) says: "From an analysis of the oil by DeJongh, it appears to contain a peculiar substance named *gaduin;* oleic, physetolic, palmitic, stearic, and myristic acids, with glycerin; butyric and acetic acids; various biliary principles; iodine, and traces of bromine. The formula of gaduin, according to DeJongh, is $C_{35}H_{46}O_9$. Dr. Luck has found a peculiar fatty acid in turbid oil, which he names *gadic acid*, and the same is obtained from the clear oil by saponification ("Neues Jahrb. für Pharm.," vi. 249). As, however, about 70 per cent. of cod liver oil is olein, and about 25 per cent. is palmitin with some stearin, gaduin and gadic acid do not constitute a very important factor. Indeed, Flückiger considers their very existence doubtful. M. Chapoteau claims to have discovered in cod liver oil a crystalline substance, *morrhuol*, containing phosphorus, iodine and bromine. He states that the brown oil yields from 4.5 to 6 parts in 100, the straw-colored from 2.5 to 3 parts, and the bleached oil from 1.5 to 2 parts, (A. J. P., 1886, p. 19). According to Dr. Lafarge (Progress Med., Feb. 20, 1886; also process for preparing) this substance represents the peculiar medicicinal properties of cod liver oil, and in tuberculosis and allied diseases may be given in capsules containing from three to five drops as about equivalent to one drachm of cod liver oil. By reaction with ammonia in distillation the oil yields a volatile alkaloid *propylamine* C_3H_9N, which has a strong pungent odor, recalling that of herring-pickle, of which the same alkaloid is an ingredient. No other official fatty oil yields a similar product. (See A. J. P., xxiv. 343.) Messrs. Gautier & Mourgues have obtained from cod liver oil the leucomaines *butylamine*, *amylamine*, and *hexylamine*, *hydrodimethlpyridine*, and two fixed bases, *aselline* ($C_{25}H_{32}N_4$) and *morrhuine* ($C_{19}H_{27}N_3$). Aselline was found by its discoverer to be relatively feeble physiologically; morrhuine, of which about 2 milligrams are believed to exist in a tablespoonful of ordinary cod liver oil, is affirmed to have the properties of exciting the appetite and acting as a powerful diuretic and diaphoretic. Some have been disposed to ascribe the virtues of cod liver oil to its iodine and bromine; but these are in too small proportion for much effect, and the oil has produced results which have never been obtained from iodine and bromine themselves. The presence of iodine cannot be detected by the usual tests. It is necessary to convert the oil into a soap, and to carbonize this, before it will give evidence of iodine. The proportion never exceeds 0.05 per cent., or 1 part in 2000, and it is by no means certain that iodine is always, if ever, present in pure oil. The proportion of iodine present has been recently investigated by E. C. Stanford (Pharm. Journ. (3) xiv. 353), who found it to be extremely minute, ranging from 0.000138 to 0.000433 per cent., with an average of 0.000322 per cent. The oil is capable of dissolving a larger proportion of iodine, and if any specimen contain more than 0.05 per cent. there is reason to suspect that iodine has been fraudulently added."

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"As to its mode of action, there has been much difference of opinion. Some consider it merely a nutritive agent, having the advantage over other oleaginous substances of a readier entrance into the system and more easy assimilation. But we cannot agree with this opinion. Other oleaginous substances, certainly not less nutritious, have not been equally efficient, though taken in much larger quantities. If this be the true explanation, persons living chiefly on milk, which abounds in oil, or on fat pork, ought to show a special exemption from scrofulous complaints. The probability appears to us to be that, in consequence of some peculiar principle or principles it contains, it exercises a stimulant and alterative influence on the processes of assimilation and nutrition, thereby aiding in the production of healthy tissue."

I think I have offered sufficient evidence to prove (1) that cod liver oil probably owes its virtues in great measure to the principles discovered by M.M. Gautier & Mourgues, which I have named. (2) That preparations containing these principles may be looked upon as of therapeutic value.

I have now to consider the "so-called elegant preparations of cod liver oil from which the oil has been removed." As already mentioned the word "removed" is misapplied, because its use presupposes that the oil was first in these preparations, and was subsequently removed, whereas I have yet to find a preparation of cod liver oil from which any one *claims* that the oil has been removed. The question properly stated, should be, "Do the so-called elegant preparations, said to be made from the alleged active principles of cod liver oil, possess therapeutic value?"

There are several such preparations on the market, but as I have not analyzed them, I cannot state whether they are all what they claim to be or not.

The word "morrhuol" is used by one manufacturer for his extract of cod liver oil, which is said on good authority to contain the active principles in solution in an oily body. This same extract when made by another house is called "gaduol," and when made by still another it is called "jecorol." It is from "jecorol" that their "so-called elegant preparation of cod liver oil" is prepared. I have been enabled to obtain from this house a specimen of jecorol, and of the combined alkaloids separated from jecorol in powder, which I here present before you.

These combined alkaloids were called by Bouillot, of Paris, "pangaduine," *pan* meaning all, and *gaduine* the combination properly describing the alkaloids of oil from *gadus*, the *cod*. *Jecorol* and *panjecorine* are names applied to the extracts of cod liver oil and combined alkaloids already referred to and are derived from the ancient appellation of cod liver oil, *Oleum Jecoris Aselli*.

Finally, in answer to the query: "Do the so-called elegant preparations of cod-liver oil, from which the oil has been removed (?) possess therapeutic value?" I would say unhesitatingly: *Yes, provided these preparations are made from the principles isolated from cod-liver oil,* already referred to, for it is very evident that if the ingredients of a preparation are of therapeutic value, the preparation itself must be of value, all other things being equal.

WHAT IS THE QUALITY OF THE REDUCED IRON DISPENSED BY PHARMACISTS?

BY ALFRED R. L. DOHME, PH.D.

In order to answer this query it was necessary to establish the requirements of a standard article and decide which constituents to determine quantitatively, applying these determinations to samples of reduced iron, which would cover the various kinds dispensed by pharmacists. The Ferrum Reductum of the U. S. Pharmacopœia, 1890, was naturally selected as the standard, and the following constituents of the samples determined: (*a*) *Inorganic residue*, insoluble in hydrochloric acid; (*b*) *Organic residue*, insoluble in hydrochloric acid; (*c*) *Total iron*, determined as ferric oxide; (*d*) *Iron combined as sulphide*, and determined as sulphate; (*e*) *Uncombined iron*, determined volumetrically by the method of the U. S. P., 1890; (*f*) *Iron combined as oxide*, and determined by difference between the amount of total iron and iron combined as sulphide plus iron in the uncombined state; and, (*g*) *Shortage*, which is assumed to be carbon lost as carburetted hydrogen during the action of the acid on the iron, and is determined by subtracting the total percentage of the ingredients found from one hundred per cent. The method adopted was the following: the reduced iron was treated, in a beaker covered with a watch-glass, with dilute hydrochloric acid and gently heated on a water-bath until no more hydrogen was given off. By this means some of the carbon present was unquestionably lost as carburetted hydrogen, but this was accounted for in the table below as shortage in total percentage, and plays no figure in the result. When cool and after dilution, the liquid was filtered through a tared filter, which had been previously dried for an hour at 100° C. After washing thoroughly, the filter and its contents were dried at 100° C., and weighed. Then it was incinerated in a platinum crucible, and the residue weighed and recorded as inorganic residue, insoluble in dilute hydrochloric acid. By subtracting this weight from that of the total residue, the weight of the organic residue insoluble in dilute hydrochloric acid was obtained. The filtrate from the residue was then diluted with distilled water to one hundred cubic centimeters, and an aliquot part taken and treated on a water-bath with nitric acid until no reaction for a ferrous salt was obtainable. An aliquot part of this was then used to determine the total iron by precipitating it hot with an excess of ammonia water as hydroxide. After carefully washing with hot water it was incinerated and glowed in a platinum crucible, after oxidizing by means of nitric acid, and thus all converted into ferric oxide and weighed as such.

In order to determine the amount of iron combined as sulphide, the reduced iron powder was boiled over a free flame with an alkaline solution of potassium permanganate which oxidized all the sulphide to sulphate. The mass obtained, consisting principally of ferric and manganic hydroxides, was filtered and washed with hot water, when all the sulphate, mostly as potassium sulphate, passed through into the filtrate. The latter was then precipitated hot by a hot solution of barium chloride in presence of an excess of hydrochloric acid, and from the amount of barium sulphate obtained, the amount of iron sulphide originally present was calculated.

The amount of uncombined iron was determined by treating the reduced iron powder with a solution of mercuric chloride for an hour on a water-bath, allowing to cool, filtering, making the solution up to one hundred cubic centimeters, and titrating an aliquot part thereof with a decinormal solution of potassium permanganate. The amount of iron combined as oxide was determined by subtracting the amount of iron combined as sulphide plus the amount present as uncombined iron from the total iron, the assumption being made that the iron in reduced iron is present only in these three conditions.

Samples were secured from all of the local wholesale drug houses and many retail drug stores. Five different products were thus collected and their analysis is given below. It is a well-known fact that some of the manufacturers put several grades of reduced iron on the market which they distinguish usually by the terms gray and black, the gray containing the larger amount of metallic iron. It is often customary to give the percentage of metallic iron in the product. However, most of the wholesale druggists usually carry only one grade and supply all their customers therewith, unless a different grade is specified. The majority of the samples secured were black reduced iron, which contains a goodly percentage of oxide and sulphide of iron as well as carbon. Samples R and I were gray, samples W, S and B were black in color. Below are the figures:

Product.	Inorganic Residue.	Organic Residue.	Total Iron.	Iron combined as Sulphide†	Uncombined Iron.	Iron combined as Oxide.	Difference or shortage regarded as carbon.
R	0.4*	0.5	98.5	0.00	83.0	15.5	0.6
W	1.17	1.81	82.2	9.3	47.0	25.9	14.82
I	1.63	1.23	97.8	2.1	92.0	3.7	0.00
B	1.65	1.0	85.8	18.8	35.0	32.0	11.55
S	1.67	1.58	96.0	8.27	68.0	19.73	0.75

The products most generally met with in the pharmacies were those marked W and S, both of which, as the figures show, contain less than the required amount of metallic iron to bring them up to the standard of the U. S. Pharmacopœia, 1890, which is eighty per cent., and do not answer the pharmacopœial requirement of containing no sulphide of iron. Two of these products are exceptionally good, viz., those marked R and I, the two gray samples; and one of them, B, is much below par, and certainly never should be used.

On the whole, the query can be answered by the words—"not up to standard;" because comparatively few, if any, pharmacies in Baltimore, and in other cities it is undoubtedly the same, keep either of the products which were found to be up to or above the standard of the U. S. Pharmacopœia, 1890, *i. e.*, the products R and I.

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* These numbers are all percentages. † Assumed to be present entirely in the ferrous condition.

QUANTITATIVE DETERMINATION OF SOME SUBSTANCES IN AQUEOUS SOLUTION BY MEANS OF THE REFRACTOMETER.

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In the year 1865 Landolt[1] published a paper, in which he shows that if $(M-1)/D$ is the specific refraction of a mixture and $(m-1)/d$, $(m_1-1)/d_1$, $(m_2-1)/d_2$, etc., are the specific refractions of the components, $P(M-1)/D = p(m-1)/d + p_1(m_1-1)/d_1 + p_2(m_2-1)/d_2 +$ etc., where p, p_1, p_2, etc., are the weights of the components in a weight P of the mixture. If there are only two components, and we call P one hundred, the equation becomes $100(M-1)/D = p(m-1)/d + (100-p)(m_1-1)/d_1$ and $p = 100[(M-1)/D-(m_1-1)/d_1] \div [(m-1)/d-(m_1-1)/d_1]$. Since $p_1 = 100-p$, both components can be determined.

Wuellner[2] in a paper published in 1866 shows that for mixtures of glycerine and water at a temperature of 20 degrees Cent. the calculated and observed values do not agree, there being a difference of about three units of the fourth decimal place. With mixtures A(3.7 parts glycerine and one part water), B(1 part glycerine and 1 part water), and C(0.5 part glycerine and 1 part water), he found numbers as follows: for A, $4.7(A-1)/D = 4.7(0.35129) = 3.7(a-1)/d + 1(a_1-1)/d_1 = 3.7(0.35918 + 0.32463)$, or $1.65106 = 1.65359$, showing a difference of 0.00253 between the two members of the equation. In like manner B gave $2(0.34168) = 0.35918 + 0.32463$; or $0.68336 = 0.68381$, showing a difference of 0.00035. For C he found $1.5(0.33596) = 0.5(0.35918 + 0.32463)$; or $0.50394 = 0.50422$, showing a difference of 0.00028.

Since that time Lenz,[3] Strohmer[4] and Skelweit[5] have published tables for the quantitative determination of glycerine in aqueous solution, in which m is given for sodium light. These tables show very constant differences in m for each interval of one per cent. in content of glycerine.

In the following tables the per cent. of hydrochloric acid, sulphuric acid and acetic acid are a mean value of the per cent. found by titration and the per cents. calculated from the specific gravity of the solutions, except for acetic acid of from sixty-five to one hundred per cent.

The alkali used in titration was standardized by freshly crystallized oxalic acid, and by oxalic acid which was dried at 100 degrees C. to a constant weight. The alkali was found to be 0.7572 N/10 by the crystallized acid, and 0.7581 N/10 by the acid dried to constant weight. In the case of the acetic acid of from 65 to 100 per cent., the solutions were made of such strength that 100 cubic centimeters of the solutions required from 120 to 150 cubic centimeters of the alkali, 100 cubic centimeters of the solution being taken in each case.

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[1] Liebig's Annalen, Suppl. IV, page 1.

[2] Pogg. Ann., vol. 133, p. 1.

[3] Zeit. f. anal. Chemie, 19, p. 302.

[4] Monatshefte f. Chemie, 5, p. 61.

[5] Repert. d. anal. Chemie, 5, p. 18.

The per cents. of ammonia, alcohol and nitric acid were calculated from the specific gravity of the solutions.

The per cent. of sulphuric acid was calculated from the table of Lunge and Isler;[1] the per cent. of hydrochloric acid from the table of Lunge and Marchlewski;[2] the per cent. of nitric acid from the table of Lunge and Rey;[3] the per cent. of acetic acid from the table of Oudemans;[4] the per cent. of ammonia from the table of Lunge and Wiernik;[5] and the per cent. of alcohol from the table of Dr. Squibb.[6]

The refractometer used was a Pulfrich refractometer made by Max Wolz in Bonn. The circle with vernier gives readings to one minute of arc. From the tables following it will be seen that duplicate readings do not vary more than one minute, which will make a corresponding variation in the index of refraction of from eight to ten units of the fifth decimal place.

The method of taking the readings was as follows: The glass-stoppered flasks containing the solutions were placed in a tray, through which water circulated from the hydrant in the room. The prism of the refractometer was also placed in the tray. After the water from the hydrant became constant in temperature and the temperature of the prism and solutions had become the same as that of the water, the prism was taken out, hastily wiped dry and placed on the instrument with some of the solution to be investigated. The reading was taken as quickly as possible, and the prism again placed in the tray. This was again taken out and as before quickly wiped dry, and another solution used. The time required for taking a reading after the solution was taken from the tray was probably not more than ten seconds. The duplicate readings given in the following tables were made with a second portion of the solution in each case.

I have assumed that the temperature at which the readings were taken was the same as that of the water in the tray, although the temperature of the room was always a few degrees higher than that of the water circulating through the tray.

In all cases sodium light was used with the instrument. The sodium light used was obtained in the following way: a piece of thin asbestos paper of suitable size was spread out on a table and covered with a thin layer of sodium nitrate. Beginning at one edge it was rolled into a cylindrical form and bound with iron wire at intervals along its length, the ends being doubled over and bound to prevent the escape of the sodium nitrate.

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[1] Zeit. f. angew. Chemie, 1890, p. 129.

[2] Zeit. f. angew. Chemie, 1891, p. 133.

[3] Zeit. f. angew. Chemie, 1891, p. 165.

[4] Table 73 of Landolt and Boernstein's tables.

[5] Zeit. f. angew. Chemie, 1889, p. 183.

[6] U. S. Pharmacpœia for 1890.

A cylinder one inch in diameter and ten inches long, made in this way, will furnish light for ten days when used five hours each day, with a three-tube Bunsen-burner. The cylinder is clamped in a small Hoffman-clamp, such as is used for holding burettes, and fastened to a retort-stand at a suitable distance above the burner. When arranged in this way it gives a steady, brilliant sodium light, entirely sufficient for all ordinary purposes.

A Landolt-burner for sodium light, such as is furnished by Franz Schmidt and Haensch with their Laurent polariscopes, required too constant attention, and an attempt was made to salt the flame by means of a wick made of fibres of asbestos. This was found to clog after a few hours' use, and to give a weak light. One of the students in my class became tired of salting the flame and made a hollow cylinder of asbestos paper, filled it with the sodium salt, and it was found to work very well. Different sodium salts were tried, and the nitrate was found to give the best result. It was found, however, that the cylinder became brittle and would not stand much handling. I afterwards made one as described and found it very satisfactory.

I. SOLUTIONS OF HYDROCHLORIC ACID.

Table comparing the specific gravity, per cent. content, and index of refraction for sodium light of hydrochloric acid in aqueous solution:

Number of the solution.	Specific gravity at 15°/4° C.	Per cent. of hydrochloric acid in the solution.	First reading on the refractometer at 16° C.	Second reading on the refractometer at 16° C.	Index of refraction for the first reading.	Index of refraction for the second reading.	Average of the indices of refraction.
1	1.0111	2.33	64–40	64–40	1.33834	1.33834	1.33834
2	1.01155	4.51	63–38	63–39	1.34362	1.34354	1.34358
3	1.0261	5.31	63–19	63–20	1.34526	1.34518	1.34522
4	1.03315	6.89	62–38	62–38	1.34886	1.34886	1.34886
5	1.0527	10.62	61–04	61–04	1.35725	1.35725	1.35725
6	1.05775	11.65	60–38	60–37	1.35961	1.35971	1.35966
7	1.0708	14.23	59–38	59–39	1.36516	1.36525	1.36521
8	1.08135	16.55	58–39	58–39	1.37067	1.37067	1.37067
9	1.0939	18.93	57–41	57–41	1.37617	1.37617	1.37617
10	1.10395	21.06	56–45	56–45	1.38155	1.38155	1.38155
11	1.1160	23.28	55 46	55–47	1.38728	1.38718	1.38723
12	1.12845	25.40	54–50	54–50	1.39276	1.39276	1.39276
13	1.1410	28.11	53–57	53–57	1.39799	1.39799	1.39799
14	1.15295	30.45	53–02	53–01	1.40345	1.40355	1.40350
15	1.1641	32.62	52–08	52–09	1.40884	1.40874	1.40879
16	1.17615	34.90	51–20	51–19	1.41365	1.41375	1.41370
17	1.1887	37.17	50–31	50–31	1.41858	1.41858	1.41858
18	1.19525	38.42	50–00	50–00	1.42170	1.42170	1.42170

If the difference in the indices of refraction of numbers 1 and 9 be divided by the difference in the per cent. content of acid for the same numbers, an average difference of the index of refraction of 228 units of the fifth decimal place is found for an increase of one in the per cent. content of acid in the solution.

In like manner the number 232 is found as a difference in the index of refraction for a difference of one per cent. content of acid between numbers 8 and 18, and an average difference of 230 units between numbers 1 and 18.

The index of refraction of water at the same temperature was found to be 1.33311. The difference between this number and that of numbers 5, 10, 14 and 18, divided by the per cent. of acid for these same numbers, gave an average difference in the index of refraction of, respectively, 228, 229, 230 and 231. Corresponding numbers obtained from indices of refraction taken at temperatures of 8 and 14 degrees C., agree closely with these.

The following table has been calculated by using these averages:

Per cent. of hydrochloric acid.	Index of refraction for sodium light at 16° C.	Per cent. of hydrochloric acid.	Index of refraction for sodium light at 16° C.	Per cent. of hydrochloric acid.	Index of refraction for sodium light at 16° C.	Per cent. of hydrochloric acid.	Index of refraction for sodium light at 16° C.
1	1.33539	11	1.35810	21	1.38111	31	1.40413
2	1.33767	12	1.36039	22	1.38341	32	1.40643
3	1.33995	13	1.36268	23	1.38571	33	1.40815
4	1.34223	14	1.36497	24	1.38801	34	1.41107
5	1.34451	15	1.36726	25	1.39031	35	1.41339
6	1.34679	16	1.36955	26	1.39261	36	1.41571
7	1.34907	17	1.37184	27	1.39491	37	1.41803
8	1.35135	18	1.37413	28	1.39721	38	1.42035
9	1.35363	19	1.37642	29	1.39951	39	1.42267
10	1.35591	20	1.37871	30	1.40181	40	1.42499

Tables for indices of refraction at other temperatures may be calculated by using the formula $(m-1)/d=$ a constant, and substituting numbers for specific gravity (d) calculated from tables in the formula. For example, in Table I, number 5, we find specific gravity 1.0527, per cent. acid 10.62, and index of refraction 1.35725. The specific gravity is given for 15.4 degrees, and for 16.4 degrees would be 1.0524. Substituting these numbers in $(m-1)/d=C$, we find $C=0.3394$. To find the index of refraction at, say 19 degrees C, we have $(m-1)/1.0515=0.3394$, $m=0.35689$, and the index of refraction is 1.35689.

II. Solutions of Ammonia.

Table comparing the specific gravity, per cent. content, and index of refraction for sodium light of ammonia in aqueous solutions.

Number of the solution.	Specific gravity at 15° C.	Per cent. Ammonia.	First reading on the refractometer at 16° C.	Second reading on the refractometer at 16° C.	Index of refraction from first reading at 16° C.	Index of refraction from second reading at 16° C.	Average index of refraction from first and second readings at 16° C.
1	0.9962	0.86	65–37	65–38	1.33361	1.33352	1.33357
2	0.9916	1.75	65–30	65–30	1.33418	1.33418	1.33418
3	0.9844	3.70	65–22	65–22	1.33484	1.33484	1.33484
4	0.9816	4.20	65–14	65–15	1.33550	1.33542	1.33546
5	0.9767	5.63	65–10	65–09	1.33583	1.33591	1.33587
6	0.9690	7.56	64–59	65–00	1.33674	1.33666	1.33670
7	0.9631	9.11	64–51	64–50	1.33742	1.33750	1.33746
8	0.9587	10.27	64–42	64–42	1.33817	1.33817	1.33817
9	0.9548	11.38	64–34	64–34	1.33884	1.33884	1.33884
10	0.9505	12.60	64–26	64–26	1.33952	1.33952	1.33952
11	0.9453	14.08	64–17	64–17	1.34028	1.34028	1.34028
12	0.9434	14.63	64–12	64–12	1.34071	1.34071	1.34071
13	0.9405	15.49	64–03	64–02	1.34147	1.34156	1.34152
14	0.9327	17.83	63–51	63–51	1.34250	1.34250	1.34250
15	0.9289	19.17	63–42	63–41	1.34328	1.34337	1.34332
16	0.9256	19.99	63–34	63–34	1.34397	1.34397	1.34397
17	0.9217	21.18	63–25	63–25	1.34474	1.34474	1.34474
18	0.9180	22.39	63–18	63–18	1.34535	1.34535	1.34535
19	0.9130	23.98	63–11	63–11	1.34597	1.34597	1.34597

If the difference between the indices of refraction of numbers 1 and 19 be divided by the difference between the per cent. content of ammonia for the same numbers, the quotient shows an average difference in the index of refraction of 54 units of the fifth decimal place for an increase of one per cent in content of ammonia in the solution.

In like manner we find that there is a difference in the index of refraction of 55 units of the fifth decimal between numbers 5 and 19, a difference of 56 such units between numbers 12 and 19, of 52 such units between 1 and 12, and of 50 such units between 1 and 8, for an increase of one per cent. in the content of ammonia.

Corresponding numbers calculated from indices of refraction taken at temperatures of 12 and 17 degrees C., closely agree with these.

By the use of these numbers the following table has been calculated :

Per cent. of ammonia.	Index of refraction for sodium light at 16° C.	Per cent. of ammonia.	Index of refraction for sodium light at 16° C.	Per cent. of ammonia.	Index of refraction for sodium light at 16° C.	Per cent. of ammonia.	Index of refraction for sodium light at 16° C.
1	1.33361	8	1.33714	15	1.34078	22	1.34464
2	1.33411	9	1.33765	16	1.34132	23	1.34520
3	1.33461	10	1.33817	17	1.34186	24	1.34576
4	1.33511	11	1.33869	18	1.34241	25	1.34632
5	1.33561	12	1.33921	19	1.34296	26	1.34688
6	1.33612	13	1.33973	20	1.34352	27	1.34735
7	1.33663	14	1.34025	21	1.34408	28	1.34792

To obtain the increment in the index of refraction for an increment of one degree in temperature, proceed as under the table for hydrochloric acid.

III. Solutions of Nitric Acid.

Table comparing the specific gravity, per cent. content, and index of refraction for sodium light of nitric acid in aqueous solution.

Number of the solution.	Specific gravity at 15°/4° C.	Per cent. of nitric acid (calculated).	First reading on the refractometer at 16° C.	Second reading on the refractometer at 16° C.	Index of refraction from first reading at 16° C.	Index of refraction from second reading at 16° C.	Average index of refraction from first and second readings.
1	1.01826	3.39	64–51	64–52	1.33742	1.33733	1.33738
2	1.03951	7.19	63–54	63–54	1.34225	1.34225	1.34225
3	1.06166	10.95	62–54	62–54	1.34745	1.34745	1.34745
4	1.08302	14.43	62–00	62–00	1.35222	1.35222	1.35222
5	1.10722	18.24	60–59	61–00	1.35770	1.35761	1.35766
6	1.13048	21.84	60–05	60–04	1.36265	1.36274	1.36270
7	1.15457	25.53	59–10	59–09	1.36776	1.36785	1.36781
8	1.18027	29.42	58–10	58–10	1.37342	1.37342	1.37342
9	1.20378	32.91	57–21	57–22	1.37809	1.37800	1.37805
10	1.23133	36.98	56–38	56–37	1.38223	1.38233	1.38228
11	1.26084	41.47	55–48	55–49	1.38708	1.38699	1.38704
12	1.28493	44.68	55–10	55–09	1.39080	1.39090	1.39085
13	1.30853	48.53	54–32	54–34	1.39453	1.39433	1.39443
14	1.33231	52.76	54–02	54–02	1.39749	1.39749	1.39749
15	1.35451	56.57	53–37	53–36	1.39997	1.40007	1.40002
16	1.37592	60.48	53–17.5	53–18	1.40190	1.40185	1.40188
17	1.39440	64.13	53–07	53–07	1.40295	1.40295	1.40295
18	1.40796	67.05	53–01	53–00	1.40355	1.40365	1.40360
19	1.4344	73.14	53–00	53–00	1.40365	1.40365	1.40365

Again, taking the index of refraction at 16 degrees C., as 1.33311, and dividing the difference between this and the index of refraction of number 5 by the per cent. content of number 5, we find an average difference in the index of refraction of 134 units of the fifth decimal place for an increase of one per cent. in the content of acid. Between water and number 9 we find in like manner that there is an average increase in the index of refraction of 136 units of the fifth decimal place for an increase of one per cent. in content of acid.

In like manner we find an average difference in the index of the refraction of 108, 77, 64 and 48 units of the fifth decimal place between numbers 9 and 12, 12 and 15, 13 and 16, and 14 and 17 respectively, for a difference of one per cent. of the content of acid.

From these numbers it is seen that there is a fairly constant difference in the index of refraction for a difference of one per cent. in content of acid up to solutions containing 30 per cent. acid, where the difference begins to decrease rapidly. However, the differences are large enough up to solutions containing 60 per cent. of acid to warrant their use in estimating the per cent. content of acid.

The following table gives approximate values for the index of refraction for solutions up to 60 per cent.:

Per cent. of nitric acid.	Index of refraction for sodium light at 16° C.	Per cent. of nitric acid.	Index of refraction for sodium light at 16° C.	Per cent. of nitric acid.	Index of refraction for sodium light at 16° C.	Per cent. of nitric acid.	Index of refraction for sodium light at 16° C.
1	1.33437	16	1.35453	31	1.37488	46	1.39148
2	1.33563	17	1.35595	32	1.37616	47	1.39236
3	1.33689	18	1.35736	33	1.37742	48	1 39321
4	1.33816	19	1.35976	34	1.37866	49	1.39403
5	1.33943	20	1.36016	35	1.37987	50	1.39482
6	1.34073	21	1.36155	36	1.38105	51	1.39550
7	1.34205	22	1.36284	37	1.38220	52	1.39631
8	1.34339	23	1.36413	38	1.38333	53	1.39700
9	1.34475	24	1.36551	39	1.38443	54	1.39765
10	1.34613	25	1.36688	40	1.38550	55	1.39827
11	1.34752	26	1.36824	41	1.38654	56	1.39885
12	1.34891	27	1.36959	42	1.38756	57	1.39939
13	1.35030	28	1.37093	43	1.38866	58	1.39989
14	1.35170	29	1.37226	44	1.38963	59	1.40035
15	1.35311	30	1.37358	45	1.39057	60	1.40067

If we have a solution containing more than 60 per cent. of nitric acid we may determine the per cent. strength of the solution by the use of the refractometer in the following way: assume a solution containing sixty-five per cent. acid. Take the reading on the refractometer as usual, then add to it from one-fifth to one volume of water, and take the reading again at the same temperature.

If one-fifth volume of water is added, then the diluted solution will con- 65(13.99)/15.99=56.8 per cent., assuming that 10 cubic centimeters were diluted, and should give an index of refraction corresponding to that for 56.8 per cent. in the preceding table if the temperature is the same. If one-half volume of water is added, then we would have a solution containing 65(13.99)/18.99=47.4 per cent. acid, and should give an index of refraction corresponding to that for the same per cent. in the table.

It will be understood the higher the per cent. of acid, the more the water that must be added to the solution to make it of low enough per cent. to be estimated by the refractometer and the table.

In practice we might not know the specific gravity of the original solution, but we could find it for the diluted solution after having determined the per cent. by the refractive index. The specific gravity of a solution of nitric acid containing 47.4 per cent. acid is approximately 1.2994, and therefore, the diluted solution is approximately 14.6(1.2994) = 18.97 grams. The 10 cubic centimeters of the original solution weighed then 18.975 grams and its specific gravity is 1.397. The number 14.6 is the approximate volume of the diluted acid (10 C.c. of the 65 per cent. acid, plus 5 C.c. of water). This contraction can be calculated from tables for specific gravity, but in practice it is better to obtain it as follows: into a tube graduated in 1/10 C.c., put 10 C.c. of the solution to be estimated, and add the desired amount of water, and allow to stand after mixing till cool. Of course the volume can be read directly from the tube to one-tenth cubic cetimeter, which is close enough for all ordinary practical purposes.

IV. SOLUTIONS OF SULPHURIC ACID.

Table comparing the specific gravity per cent. content, and index of refraction for sodium light of sulphuric acid in aqueous solution.

Number of the solution.	Specific gravity at 15°/4°.	Per cent. of sulphuric acid.	First reading on the refractometer at 16° C.	Second reading on the refractometer at 16° C.	Index of refraction from first reading at 16° C.	Index of refraction from second reading at 16° C.	Average index of refraction from first and second readings.
1	1.0304	4.56	64–38	64–39	1.33851	1.33843	1.33847
2	1.0655	9.48	63–30	63–30	1.34431	1.34431	1.34431
3	1.0897	12.83	64–42	64–41	1.34850	1.34859	1.34854
4	1.1227	17.21	61–38	61–37	1.35373	1.35382	1.35378
5	1.1640	22.29	60–29	60–28	1.36044	1.36053	1.36049
6	1.2010	27.22	59–21	59–21	1.36672	1.36672	1.36672
7	1.2422	32.27	58–22	58–21	1.37228	1.37236	1.37232
8	1.2822	36.84	57–21	57–21	1.37809	1.37809	1.37809
9	1.3253	42.15	56–17	56–17	1.38427	1.38427	1.38427
10	1.3704	46.75	55–19	55–20	1.38991	1.38982	1.38987
11	1.4214	51.60	54–11	54–10	1.39662	1.39671	1.39667
12	1.4634	56.41	53–16	53–15	1.40205	1.40215	1.40210
13	1.5084	60.46	52–16	52–16	1.40804	1.40804	1.40804
14	1.5664	65.57	51–10	51–09	1.41466	1.41475	1.41471
15	1.6214	69.79	50–02	50–02	1.42150	1.42150	1.42150
16	1.6864	75.91	48–56	48–56	1.42816	1.42816	1.42816
17	1.7425	81.53	47–58	47–57	1.43400	1.43410	1.43405
17a	1.7703	83.39	47–34	47–35	1.43643	1.43632	1.43637
18	1.7815	84.16	47–33	47–33	1.43653	1.43653	1.43653
18a	1.7988	86.64	47–30	47–30	1.43683	1.43683	1.43683
19	1.7995	86.71	47–29	47–29	1.43693	1.43693	1.43693
19a	1.8168	89.20	47–36	47–37	1.43623	1.43613	1.43618
20a	1.8303	92.15	47–47	47 47	1.43511	1.43511	1.43511

Taking the index of refraction of water at 21 degrees C. as 1.33246, at 16 degrees C. as 1.33311, at 8 degrees C. as 1.33392, we find an average increase in the index of refraction of 123 units of the fifth decimal place up to number five, an increase of 120 such units between numbers 5 and 9, an increase of 125 such units between numbers 9 and 13, and an increase of 127 such units between numbers 13 and 17 for indices of refraction at 16 degrees C.

For indices of refraction taken at 21 degrees C., an average increase of 122 units of the fifth decimal place, was found for an increase of one per cent. in content of acid in the solution up to number 5, 122 such units between numbers 5 and 9, 130 such units between numbers 9 and 13, and 124 such units between numbers 13 and 17.

For indices of refraction obtained at 8 degrees C., numbers corresponding to the above were found to be 127, 123, 128 and 125.

There is an average increase in the index of refraction of 121 units of the fifth decimal place for each increase of one per cent. in content of acid up to number 9 taken at 16 and 21 degrees C., and a corresponding increase for those taken at 8 degrees C., was found to be 125. A corresponding number for per cents. between numbers 9 and 17 was found to be 126 for those taken at 16 degrees C., and 127 for those taken at 21 and 8 degrees C.

By using these numbers the following table has been calculated. The table has been calculated for solutions containing from 0 to 80 per cent. of sulphuric acid. For solutions containing more than 80 per cent., the differences in the index of refraction for a difference of one per cent. in content of acid are too small and variable to be of practical use. The method given for nitric acid for solutions containing more than 60 per cent. acid, may be used for solutions of sulphuric acid containing more than 80 per cent.

Per cent. of sulphuric acid.	Index of refraction for sodium light at 16° C.	Per cent. of sulphuric acid.	Index of refraction for sodium light at 16° C.	Per cent. of sulphuric acid.	Index of refraction for sodium light at 16° C.	Per cent. of sulphuric acid.	Index of refraction for sodium light at 16° C.
1	1.33431	21	1.35838	41	1.38311	61	1.40795
2	1.33551	22	1.35960	42	1.38434	62	1.40921
3	1.33671	23	1.36083	43	1.38551	63	1.41047
4	1.33791	24	1.36206	44	1.38680	64	1.41173
5	1.33911	25	1.36329	45	1.38803	65	1.41299
6	1.34031	26	1.36452	46	1.38926	66	1.41425
7	1.34151	27	1.36576	47	1.39049	67	1.41552
8	1.34271	28	1.36700	48	1.39172	68	1.41679
9	1.34391	29	1.36825	49	1.39296	69	1.41806
10	1.34511	30	1.36950	50	1.39420	70	1.41933
11	1.34631	31	1.37075	51	1.39544	71	1.42060
12	1.34751	32	1.37200	52	1.39669	72	1.42188
13	1.34871	33	1.37325	53	1.39794	73	1.42316
14	1.34991	34	1.37449	54	1.39919	74	1.42444
15	1.35111	35	1.37573	55	1.40044	75	1.42572
16	1.35232	36	1.37697	56	1.40169	76	1.42700
17	1.35352	37	1.37820	57	1.40294	77	1.42828
18	1.35474	38	1.37943	58	1.40419	78	1.42956
19	1.35595	39	1.38065	59	1.40544	79	1.43084
20	1.35716	40	1.38188	60	1.40669	80	1.43212

The numbers 1.43340 and 1.43466 could be used for solutions containing respectively 81 and 82 per cent, acid.

V. SOLUTIONS OF ACETIC ACID.

Table comparing the specific gravity per cent. content, and index of refraction for sodium light of acetic acid in aqueous solution.

Number of the solution.	Specific gravity at 15°/4° C.	Per cent. of acetic acid.	First reading on the refractometer at 21,5° C.	Second reading on the refractometer at 21,5° C.	Index of refraction from first reading at 21,5° C.	Index of refraction from second reading at 21,5° C.	Average index from first and second readings at 21,5° C.
1	1.0065	4.65	65–13	65–14	1.33558	1.33550	1.33554
2	1.0130	9.26	64–27	64–29	1.33943	1.33926	1.33934
3	1.0203	13.97	63–54	63–55	1.34225	1.34217	1.34221
4	1.0273	18.99	63–14	63–14	1.34570	1.34570	1.34570
5	1.0355	23.99	62–37	62–37	1.34894	1.34894	1.34894
6	1.0418	29.45	62–00	62–00	1.35222	1.35222	1.35222
7	1.0457	34.24	61–29	61–29	1.35499	1.35499	1.35499
8	1.0511	38.89	60–59	60–58	1.35770	1.35779	1.35775
9	1.0561	43.21	60–28	60–28	1.36053	1.36053	1.36053
10	1.0604	48.55	59–59	59–59	1.36320	1.36320	1.36320
11	1.0642	52.81	59–30	59–30	1.36590	1.36590	1.36590
12	1.0676	58.53	59–06	59–05	1.36813	1.36822	1.36818
13	1.0697	62.13	58–45	58–44	1.37010	1.37019	1.37015
14	1.0719	67.02	58–23	58–22	1.37219	1.37228	1.37224
15	1.0741	73.67	58 05	58–05	1.37397	1.37397	1.37397
16	1.0746	78.97	57–54	57–54	1.37492	1.37492	1.37492
17	1.0734	84.03	57–45	57–46	1.37580	1.37571	1.37576
18	1.0710	89.08	57–46	57–47	1.37570	1.37561	1.37566
19	1.0664	94.33	58–00	57–59	1.37437	1.37446	1.37442
20	1.0554	99.44	58 43	58–43	1.37029	1.37029	1.37029

From a careful examination of the table it will be seen that there are per cents. above and below number 17 that have the same index of refraction. For solutions containing more than 60 per cent. acid, it is necessary to resort to the method given for determining the per cent. of nitric acid in solutions containing more than about 60 per cent. of that acid.

Taking the index of refraction of water at 21.5 degrees C. as 1.33246, and dividing the difference between this and that of numbers 4, 8, 12 and 16 by the per cent. content of acid for these same numbers, we find respectively a difference of 70, 65, 61 and 54 units of the fifth decimal place as the average difference in the index of refraction for a difference of one per cent. in content of acid up to that of these numbers. Dividing the difference of the indices of refraction between numbers 4 and 8, 8 and 12, 12 and 16 by the difference of the per cent. content of acid for these same numbers, we find, respectively, a difference in the index of refraction of 61, 53, 33 units of the fifth decimal place for a difference of one per cent. in the content of acid between these numbers.

In like manner dividing the difference in the indices of refraction between numbers 1 and 5, 2 and 6, 3 and 7, 5 and 9, 6 and 10, 7 and 11, 9 and 13, 10 and 14, and 11 and 15, by the difference in the per cent. content of acid of these same numbers, we find an average difference, respectively, of 68, 64, 60, 57, 58, 48, 48, and 39 units of the fifth decimal place in the index of refraction for a difference of one per cent. in the content of acid between these numbers.

Corresponding numbers calculated from indices taken at 13 and 20 5 degrees C. agree closely with these.

The following table has been calculated by using these numbers:

Per cent. of acetic acid.	Indices of refraction for sodium light at 21.5° C.	Per cent. of acetic acid.	Indices of refraction for sodium light at 21.5° C.	Per cent. of acetic acid.	Indices of refraction for sodium light at 21.5° C.	Per cent. of acetic acid.	Indices of refraction for sodium light at 21.5° C.
1	1.33310	16	1.34349	31	1.35341	46	1.36187
2	1.33380	17	1.34417	32	1.35403	47	1.36237
3	1.33450	18	1.34485	33	1.35464	48	1.36283
4	1.33520	19	1.34553	34	1.35524	49	1.36349
5	1.33590	20	1.34621	35	1.35583	50	1.36411
6	1.33660	21	1.34688	36	1.35641	51	1.36466
7	1.33729	22	1.34755	37	1.35697	52	1.36522
8	1.33798	23	1.34822	38	1.35765	53	1.36589
9	1.33867	24	1.34889	39	1.35827	54	1.36641
10	1.33936	25	1.34956	40	1.35882	55	1.36689
11	1.34005	26	1.35022	41	1.35934	56	1.36725
12	1.34074	27	1.35087	42	1.35986	57	1.36780
13	1.34143	28	1.35151	43	1.36039	58	1.36824
14	1.34212	29	1.35214	44	1.36089	59	1.36867
15	1.34281	30	1.35278	45	1.36138	60	1.36909

VI. Solutions of Alcohol.

Table comparing the specific gravity, per cent. content, and index of refraction for sodium light of alcohol in aqueous solution.

Number of the solution.	Specific gravity at 20°/15.5° C.	Per cent. of alcohol.	First reading on the refractometer at 18° C.	Second reading on the refractometer at 18° C.	Index of refraction from first reading at 18° C.	Index of refraction from second reading at 18° C.	Average index from first and second readings at 18° C.
1	0.99215	3.82	65–19	65–18	1.33508	1.33516	1.33512
2	0.98591	7.89	64–46	64–46	1.33783	1.33783	1.33783
3	0.98010	12.00	64–10	64–10	1.34088	1.34088	1.34088
4	0.97476	16.11	63–37	63–37	1.34371	1.34371	1.34371
5	0.96945	20.00	63–01	63–01	1.34683	1.34683	1.34683
6	0.96354	24.31	62–30	62–31	1.34956	1.34947	1.35952
7	0.95697	28.63	61–59	61–59	1.35231	1.35231	1.35231
8	0.94896	33.30	61–37	61–37	1.35427	1.35427	1.35427
9	0.94077	37.44	61–07	61–07	1.35697	1.35697	1.35697
10	0.93164	41.85	60–51	60–52	1.35843	1.35834	1.35839
11	0.92122	46.90	60–37	60–37	1.35970	1.35970	1.35970
12	0.91045	51.64	60–20	60–20	1.36127	1.36127	1.36127
13	0.89910	56.77	60–09	60–08	1.36228	1.36237	1.36233
14	0.88686	62.00	59–57	59–58	1.36339	1.36330	1.36335
15	0.87369	67.67	59–52	59–53	1.36385	1.36376	1.36381
16	0.86087	73.00	59–50	59–49	1.36404	1.36414	1.36409
17	0.84640	79.12	59–45	59–45	1.36451	1.36451	1.36451
18	0.83060	85.47	59–49	59–49	1.36413	1.36413	1.36413
19	0.81279	92.15	60–03	60–03	1.36283	1.36283	1.36283
20	0.79480	98.41	60–24	60–23	1.36090	1.36099	1.36095

Taking the index of refraction of water at 18 degrees C., as 1.33272, and dividing the difference of the indices of refraction between water and number 4, between numbers 1 and 5, 2 and 6, 3 and 7, 4 and 8, 5 and 9, 6 and 10, 7 and 11, 8 and 12, 9 and 13, 10 and 14, 11 and 15, and 12 and 16 by the difference in the per cent. content of acid for these same numbers, we find an average difference in the index of refraction of, respectively, 68, 72, 71, 69, 61, 58, 51, 40, 38, 27, 24, 20 and 13 units of the fifth decimal place for a difference of one per cent. in content of acid. These numbers compare well with numbers obtained in the same way from indices of refraction taken at 20.5 and 13 degrees C. The following table of indices of refraction for alcohol was calculated from these numbers. The table is only given for solutions containing less than 40 per cent. of alcohol, as there are two solutions of different per cent. strength for each index above 1.36000.

Per cent. of alcohol.	Index of refraction for sodium light at 18° C.	Per cent. of alcohol.	Index of refraction for sodium light at 18° C.	Per cent. of alcohol.	Index of refraction for sodium light at 18° C.	Per cent. of alcohol.	Index of refraction for sodium light at 18° C.
1	1.33340	11	1.34020	21	1.34713	31	1.35377
2	1.33408	12	1.34088	22	1.34785	32	1.35433
3	1.33476	13	1.34156	23	1.34857	33	1.35487
4	1.33544	14	1.34225	24	1.34929	34	1.35539
5	1.33612	15	1.34294	25	1.34999	35	1.35589
6	1.33680	16	1.34364	26	1.35067	36	1.35636
7	1.33748	17	1.34435	27	1.35133	37	1.35680
8	1.33816	18	1.34517	28	1.35197	38	1.35721
9	1.33884	19	1.34569	29	1.35259	39	1.35760
10	1.33952	20	1.34641	30	1.35319	40	1.35796

For solutions containing 41, 42, 43 and 44 per cent., the indices 1.35839, 1.35866, 1.35892, and 1.35925, could be used, but the index varies very rapidly here, and it would probably be unsafe to attempt to determine the per cent. of alcohol more closely than to one per cent.

In conclusion I wish to state that these tables are subject to revision, and that I hope to be able to repeat the work next year with better facilities for obtaining accurate results.

I also wish to state that I am indebted to Mr. W. M. Whitten, who has aided me greatly in duplicating much of the work of taking specific gravities of, and titrating the solutions, both of which were first taken by members of my class in optical methods in chemistry.

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THE SOLUBILITY OF CANADA BALSAM IN ALCOHOL.

BY JOSEPH E. MORRISON.

On this subject the available information is contradictory to a certain extent. Maisch (Organic Materia Medica, edition 1890, page 461), says that it is "partly soluble in alcohol." The National Dispensatory quotes Pharmacographia, "incompletely soluble in acetone and absolute alcohol," and Squire (15th edition), "soluble in 1 in 3 (or less) of absolute alcohol, 1 in 1 (or less) of rectified spirit." The writer has found the last statement at variance with the facts, as it would naturally be supposed that an oleo-resin would be more soluble in absolute alcohol than in a diluted spirit.

Judging from the results obtained, I believe that Canada balsam is insoluble in alcohol, but that it is miscible with the latter to a considerable extent, as may be seen from the following:

Two samples of Canada balsam were obtained from reliable sources for the purpose of testing this question, and the results were as follows:

5 C.c. of balsam were placed in a graduated mixing cylinder. 2 C.c. of absolute alcohol were then added, and the whole well shaken together, a perfectly clear mixture being formed. The alcohol was then added in quantities of 1 C.c., and well shaken after each addition, the mixture remaining clear till 32 C.c. had been added, when slight cloudiness appeared, which gradually increased with subsequent addition of the spirit.

With alcohol sp.gr. 0.820, 6 C.c. treated in the same manner formed clear solutions till 14 C.c. had been added, when the resin commenced to precipitate.

With rectified spirit, sp.gr. 0.838, 5 C.c. of balsam did not form a clear mixture in any proportion, the cloudiness first formed persisting through each addition, although 100 C.c. of spirit were added.

With acetone, the same treatment resulted in clear mixtures till 22 C.c. had been added, when the resin commenced to separate.

On allowing these mixtures to stand for a day or two, the resinous matter finally separated out, and after pouring off the supernatant liquid, was found to be entirely soluble in chloroform or ether.

It would seem from this that one part of Canada balsam is miscible with 6.4 parts of absolute alcohol, 2.33 parts of alcohol, and 4.4 parts of acetone or less by volume.

Balsam of Oregon fir, which, according to Maisch, is obtained from Abies Menziesii, and according to the National Dispensatory, is a mixture of rosin, turpentine and oil of wormwood, resembles that obtained from Abies balsamea in appearance, and is sometimes used as an adulterant, being much lower in price than the genuine, is entirely soluble in all proportions of absolute alcohol, and this difference of solubility may be useful as a test for this adulterant.

Montreal, Canada, August, 1894.

SAW PALMETTO (SABAL SERRULATA.)

C. C. SHERRARD, PH.C.

The chief inducement to begin a study of the composition of the saw palmetto berry has been due to the numerous inquiries within the last two or three years relative to its medicinal properties, therapeutic, etc.

The only historical or botanical description of this plant which has received any prominent attention is that contributed by Dr. J. B. Reed of Savannah, Ga., published in the "Amer. Jour. of Phar.," 1879. The apparent facts stated therein seem to have been, for the most part, forgotten or ignored by phaımacists and the medical profession, and its important uses gradually neglected. Quite recently, however, its medicinal value has elicited considerable attention.

With many, no doubt, an erroneous idea as to the character, growth and natural appearance has been formed. The palm and palmetto are generally associated in the mind with tall, unbranched, cylindrical trees, rising majestically to the height of from thirty to one hundred and fifty feet. The following botanical and historical descriptions show the opposite to be true with the saw palmetto.

Authors do not all agree as to the genus of the Natural Order Palmaceæ to which it belongs. Prof. John Darby, A. M., of Auburn, Ala., in his "Botany of the Southern States" places it with the genus Chamærops (from *chamoi*, on the ground, and *rhops* a twig).

Gray in his "Structural and Systematic Botany," 1857 Ed., and William Miller in his "Dictionary of English Names of Plants," also class Saw Palmetto with the Chamærops. On the other hand, Wood, Bessey & Gray in his "Field, Forest and Garden," 1869 Ed., class it with the genus Sabal. The few references in pharmaceutical and medical literature, which I have found, all agree with the latter classification. Wood states that he is unable to give the derivation of the word Sabal; serrulata signifies sharp teeth pointing forward like the teeth of a saw, hence the name Saw Palmetto.

The following is Wood's botanical description: Sabal serrulata, R. & S. Caudex, creeping; petioles aculeate-serrate; spadix thick, 2–3 f.; style subulate; berry oblong-ovoid. Barrens, S. C. to Fla.

Darby's description is as follows: Chamærops serrulata (Mich.) Stem creeping. Leaves flabelliform, with the stipes sharply serrate. Scape terminated by a panicle. Flowers small. Fruit nearly black, I–seeded—white. July–Aug. Common in sandy soils along the Ocmulgee. S. serrulata, Rom.

From the foregoing botanical descriptions it will be seen that S. serrulata, unlike most palmettos, does not attain any considerable height, but is rather a low shrub.

This plant or shrub is indigenous to the sandy soil of the sea-coasts of the Southern states and islands where it grows very abundantly, but with greater exuberance near the sea, where it presents one vast unbroken scrub of more than one hundred miles in length and from one to three miles wide. The leaves are so dense and together with their saw-like edges make it next to impossible for human beings to penetrate these jungles. Dr. Read in his description of the full-grown plant says that the roots are large and fibrous, extending for several feet from the stem, which when half exposed above the sand render traveling in spring vehicles almost an impossibility. Of its local and some general uses by artisans he says that the leaves form a substantial thatch for houses, and hunters can readily make from it convenient huts that last for years. The leaves are also collected, dried, put up in bales, and sold for paper stock. The rough fibrous roots, resembling in texture the husk of the cocoanut, are easily formed into scrubbing brushes.

The fruit, which is the part of the plant of particular interest, ripens in October, November, and the early part of December, and is most abundant in alternate years. It is about the size of an olive, dark purple or brown in color, very succulent and contains a pit or seed similar to the olive. Mr. J. Moeller gives a good description of the dried fruit of saw palmetto, as being "oblong-ovate, 10 to 25 Mm. ($\frac{2}{5}$ to $\frac{3}{5}$ in.) long, 5 to 9 Mm. ($\frac{1}{5}$ to $\frac{1}{3}$ in.) broad, bluntly pointed at the base, externally blackish-brown, netted-wrinkled, weighing about 5 Gms.; the pericarp is one Mm. thick, and consists of three well-defined layers of nearly equal thickness, the blackish-brown resinous epicarp, the yellowish-green mesocarp, and the yellowish, brittle endocarp, composed of schlerenchyma." The odor is peculiarly and characteristically aromatic. The aroma is chiefly due to the volatile oil, of which the yield was about one-half of one per cent. in two different samples. The taste is at first sweet and rather pleasant, but is soon followed by an acrid bitter and pungent sensation and this in turn is followed by a smooth oily taste, extending to all parts of the mouth and throat. The pungency is due principally to the volatile oil, the full effects of which are largely counteracted by the fixed oils.

In the preliminary analysis, a report of which is included with these notes, no effort was made, because of lack of time at my disposal, to separate and estimate the so-called glucoside of the berry.

The following is a report of a partial proximate analysis of the dry ripe berry. In making the analysis the general schemes of H. B. Parsons and Prof. L. E. Sayre were consulted:

I. MOISTURE.

		per cent.
1 Loss of weight of powdered drug, at 45 degrees C.	6	"
2 Loss of weight of powdered drug, at 100 to 105 degrees	10.339	"

II. INORGANIC CONSTITUENTS OF THE ASH.

1 Weight of ash at low red heat	4.142	per cent.
2 Ash, soluble in water	2.772	"
3 Ash, insoluble in water	1.370	"
4 Ash, soluble in hydrochloric acid	.714	"
5 Ash, soluble in caustic soda solution	.515	"
6 Ash insoluble in the above solvents	.141	"

7 The water solution analyzed qualitatively was found to contain:

(*a*) Aluminum	Trace.
(*b*) Calcium	"
(*c*) Magnesium	"
(*d*) Potassium	Considerable.
(*e*) Sodium	"
(*f*) Chlorides	"
(*g*) Sulphates	Trace.
(*h*) Nitrates	"
(*i*) Carbonates	Considerable.

8. Insoluble in water. Soluble in hydrochloric acid.

(*a*) Calcium	Trace.
(*b*) Magnesium	Considerable.
(*c*) Sulphates	Trace.

9. Insoluble silicates .141 per cent.

III. Organic Constituents.

1. Chloroformic extract.		
(*a*) Extractive	14.531	per cent
(*b*) Volatile oil	.540	“
(*c*) Fixed oil	12.800	“
(*d*) Chlorophyll and extractive	1.190	“
(*e*) Insoluble extractive and resinous matter	1.060	“
2. 80 per cent. alcoholic extract.		
(*a*) Extractive	14.170	“
(*b*) Resin, brown	.860	“
(*c*) Vegetable acids	.934	“
(*d*) Sugar	3.510	“
3. Aqueous extract.		
(*a*) Extractive	.880	“
(*b*) Gum	Trace.	
(*c*) Albuminoid matter	“	
4. Acidulated aqueous extract.		
(*a*) Extract	30.290	per cent
(*b*) Caustic potash extractive	6.100	“
(*c*) Sugar (glucoside, starch and allied substances)	7.56	“
(*d*) Acid extract	.84	“

Alkali extract, cellulose, and nitrogenous matter not estimated in duplicate, and therefore, withheld for a future report.

The ash consists almost entirely of the chlorides of potassium, sodium and magnesium.

Of the constituents which have been separated the oils, resins, and the total acidulated extract demand most attention.

There seem to be two fixed oils, one of a light lemon color, and the other of a tolerably deep green, with a shade of brown. A complete separation of these two oils was not effected; each upon aging and oxidation showed a decided crystalline deposit, the former assuming a marked rancid sweet-oil odor and taste; the latter retaining its mild and not unpleasant bland butyraceous odor and taste. Upon aging the color of these oils was also somewhat modified, each becoming perceptibly lighter in color, due, perhaps, to the slight amount of vegetable coloring matter held in solution by the oils. The specific gravity of the total fixed oils is .8851, the congealing point about 11.5° C, and the melting point about 19.5° C. After a second treatment these fixed oils still possessed the characteristic acrid and pungent properties of the volatile oil. The latter when taken into the mouth produces a sensation of heat, and a prickly sensation to the fauces, somewhat similar, but not so severe as that produced by oleo-resin of capsicum.

The final insoluble extractive and resinous matter under (*e*) of the chloroformic extract was a fluffy dark-brown powder, odorless, and having a peculiar slight anasthetic effect when placed upon the end of the tongue.

Resin (*b*) from the 80 per cent. alcoholic extract has a pleasant aromatic taste and odor.

The sugar solution (*d*) when concentrated to constant weight assumes a rich and beautiful brownish-red color ; the taste is not to say sweet, but slightly peculiar to the fruit itself.

After treating the dregs from the alcoholic menstruum with a large amount of water and concentrating, a very small amount of extractive was obtained, but when these dregs were treated with acidulated aqueous menstrum, the solution yielded a large amount of extractive.

The caustic potash precipitate of this latter solution was ruby-red when moist and reddish brown when dry, having a brittle resin-like fracture. The filtrate after treatment with caustic potash was assayed for sugar in the usual way with Fehling's solution. At this point another interesting feature presents itself, namely, to separate and estimate the substances converted over by the acidulated aqueous extract. This latter subject, together with a complete examination of the oils, will form the basis and main part of my immediate future work upon this subject.

To conclude, it may be of interest to review some of the principal claims made for the therapeutic efficacy of this drug.

Dr. F. A. Evans (Medical Brief) states that 15 minims of the fluid extract of saw palmetto will abort a paroxysm of migraine.

Its application as a remedical agent seems warranted, and while, as with most drugs, some of its medicinal properties may have been overdrawn, yet it is evident that it possesses highly nutritive properties.

Dr. J. B. Read (Am. Jour. Pharm.) thus summarizes as to its medical use : In all cases where a higly nutritive agent is needed, it seems to apply well and to fulfill the indication. By its peculiar soothing power on the mucous membrane it induces sleep, relieves the most troublesome cough, promotes expectoration, improves digestion, and increases fat, flesh and strength. Its sedative and diuretic properties are remarkable. It has been used with benefit in cardiac asthenia, phthisis (especially laryngeal phthisis), chronic bronchitis and dilation of the bronchial tubes. Its action in catarrhal affections is rapid and permanent. A cold in the head may be abated by two or three doses. Mix in boiling water and use by inhalation ; it has been found to be very beneficial in chronic ozaena.

Considering the great and diversified power of the saw palmetto as a therapeutic agent, it seems strange that it should have so long escaped the notice of the medical profession. Several years ago, while on a hunting expedition in the wilds of Florida, my attention was called to the great fattening properties of the berries, and the peculiar quality of the fat of animals that feed on them. Most animals in the palmetto regions are very fond of the fruit. During the summer months in these parts, the supply of fruit is scarce for such animals as bears, raccoons, opossums and hogs, and they have to work hard to eke out a living from roots and such animal foods as they can find upon the sea coast—as turtle eggs, dead fish, etc. —and they consequently become very thin. As soon, however, as the palmetto berries begin to ripen they improve rapidly, and in a few weeks have acquired an enormous quantity of fat, so as to become so unwieldy that they are an easy prey to the hunter. This fat, like that of mast-eating animals, consists principally of olein, and will not make lard. The berries, when dropped into water, are seized and eaten with avidity by the fishes. Even the natives frequently acquire a taste for the berries, and eat them freely. "It is the only thing, it is claimed, that will fatten a piny-woods razor-back hog."

The foregoing statements as to its medical properties and uses are supplemented thus by J. M. Dixon, Ph.G. (Pacific Rec. of Med. and Surg.):

This is a sedative, nutrient and diuretic. It improves digestion, induces sleep, increases flesh and weight and strength. It relieves irritation of the mucous membrane of the throat, nose and larynx, and controls and cures purulent discharges from the mucous membrane. The fluid extract of this valuable berry as a nutrient tonic is far in advance of the compound hypophosphite, and has a special action on the glands of the reproductive organs, as the mammæ, ovaries, prostate, testes, etc. Its action is that of a great vitalizer, tending to increase their activity, to promote their secreting faculty, and add greatly to their size.

It is especially indicated in all cases of wasting of the testes, such as varicocele, or as induced by masturbation, or which is often present in sexual impotency. In atrophy of the prostate, so very common in cases of sexual perversion, this drug operates in a most remarkable manner in overcoming the withered, blighted state of the gland; so in uterine atrophy, dependent upon the ovarian blight, its action is unexcelled. In gynæcological practice it is much used to promote the growth of the mammæ, but it is on the prostate gland that this remedy exercises its best effects.

S. F. Dupon, M. D., in the American Therapist, says: "It is in whoop-cough, bronchitis, etc., where the marvelous power of this remedy manifests itself; it seems to modify in a remarkable manner the progress of pertussis. Much has been written lately upon the efficacy of the Saw Palmetto in diseases of the bladder, prostate, etc., which I can most positively endorse, relief being often afforded from the local application of the tincture within an hour, while the urine is fully impregnated with the odor of the drug.

Care must be exercised to obtain a reliable product, as only one variety produces the true medicinal oil; much also depends upon the location and character of the soil.

Assuming that the views advanced by Dr. Kinnicut (New York Medical Journal, May 21, 1892), are correct, and that guaiacol combines in the blood with toxic albuminoids engendered by the disease, and that they are thus rendred non-toxic and their elimination favored, we have good reason to believe that an agent so potent as Saw Palmetto, acting on mucous membrane, invigorating the system, creating fat, would be a great boon to the emaciated suffering from tuberculosis.

Recently I had an opportunity of observing the influence of this drug upon a case most desperate of laryngitis occurring in a negro. There was an absolute loss of voice, and total inability to swallow liquids. After exhausting all known methods of treatment, I put him upon drachm doses of the tincture, with five grains of ammonium chloride, although he could do no more than retain the medicine in his mouth. Within six hours he was able to swallow, and in twenty-four hours he expectorated shreds of membrane and enormous quantities of mucus, which gave evidence of the gravity of his disease.

THE NATIONAL FORMULARY—A CRITIQUE UPON CRITICISMS.

BY LUTHER F. STEVENS, BROOKLYN.

The most general of objections which have been brought forward by good workers is, that there are too many preliminaries, and many think simplification necessary for the sake of the busy druggist. So much has this cry gone forth, because pushed by a few, that it even seems to have impressed the present Chairman of the Committee, insomuch that in his report rendered at Chicago for 1893, he recommends formulas to be made complete within themselves whenever possible, although personally realizing the many advantages connected with the standing arrangement.

Former answers to this point do not seem to have received the consideration given to objections, for these are always plentiful, and a goodly share of those who bring them up seldom read an article throughout which is disparaging to their theories.

A smaller line, but vociferous, and from which some are always ready to crop out, are those whose hobby it is to replace alkaloids in every formula, no matter what, nor caring for its purpose, where a corresponding galenical is used as strychnia in place of nux vomica, morphine for opium, quinine instead of bark in elixir, to which they would attach the title calisaya. These flocked about the committee while at work and are still busy. Owing to increasing pressure, and their evident non-intention of yielding to argument, we gave these a choice on the last, No. 42 and No. 92, the latter however, having its proper name instead of a deceptive one.

Then come gentlemen who wish to throw out single articles, for no apparently good cause, as talcum, citro-chloride of iron, chloral-camphor, and a list which might be continued for pages.

The talcum men think it should not have been taken up because it is a mineral, yet most probably they use carbonate of magnesium or phosphate of calcium, or possibly the carbonate, in most calm serenity that there is no disturbance in their own methods. Silicate of magnesium is more nearly inert to ordinary pharmaceutical liquids than any of the others, and for small work gives a better filter bed, while absorbing less liquid than paper pulp. In a few cases only does it combine, and then is avoided.

To those who really believe that the preliminary list is too large, one answer is worth reiterating, which came from Mr. Francis Hemm, who, before the Missouri Pharmaceutical Association, in 1891, gave an exhibition of such, costing $14.50 to make up and serving as foundations for nearly all elixirs, syrups and wines in the whole book, the renewals to the line coming singly, so that further expenditure of time and money on stock would be in small lots, each requiring but little at one time. It is no more trouble to make five gallons of elixir taraxacum compound, one of the main foundations, than a similar quantity of tinctur of gentian compound, nor is it as expensive, having a less amount of alcohol. It would seem that those are poor business men who hesitate to put out so small a sum which will spread over several months and yield upon itself and added materials from 20 per cent. to 50 per cent. profit over purchasing or handling proprietary goods. Yet a great swarm of objectors hang upon these small things, especially when partly upheld by some who are well known in the pharmaceutical world, taking their lead from the latter, and here are some of the excuses made: "Our counter business does not allow time to spend upon all these matters;" "We have no laboratory to do the work in;" "It costs too much;" "It is too much trouble." Several gentlemen write their trade journals after this fashion: "Can you tell me where I can get these basic preparations ready-made? then, possibly, we can do something at the finishing." One desired elixir of gentian and iron, and aired his woes in print somewhat thus: "He turned to No. 69 and found it necessary to make elixir of gentian and tincture of citro-chloride of iron: to make elixir of gentian he first had to make aromatic spirit and then aromatic elixir; and he wanted no more of such bother." If this worrier over trouble had ordered his clerk to have compound licorice mixture ready in the usual amount, and instead received complaint that there was no time to make wine of antimony, paregoric and spirit of nitre, there would probably soon have been a vacancy in the working staff of that store. Shall we not call them *all* lazy men who talk thus?

The present edition of the National Formulary asks that certain foundation-material be kept in stock, and the list has been arranged with definite reason and by careful trial, to which the test of time when applied has shown most favorably.

Three simple elixirs for drugs which are not very unpleasant. Aromatic, so named to distinguish it from that of the U. S. Ph. of 1880,* anise, and curacoa.

Five others, each containing liquorice: Adjuvans, especially designed for salines; glycyrrhiza; glycyrrhiza aromatic, intended for resinous mixtures;

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*This name has been adopted in the Pharmacopœia of 1890, but the product is different.

taraxacum compound, a general mild adjuvant largely used; eriodictyon aromatic (Yerba Santa minus the bitterness), particularly studied out as an available mask for quinine.

Six special flavors or starting points: Compound spirit of orange; aromatic spirit, for which an alternate formula is given, using the fruit; compound spirit of cardamom, arranged to give flavor without color; spirit of curacao; spirit of nitro-glycerin; spirit of phosphorus; syrup of coffee.

Ten accessories: Purified extract of liquorice; Irish moss gelatine; mucilage of Irish moss; mucilage of dextrin; purified talcum; tincture of citro-chloride of iron; tincture of cudbear; compound tincture of cudbear and tincture of quillaia—a total of twenty-five articles when counting everything in sight.

These may, any or all, be made in quantities suited to trade needs in each man's locality; for some places several of the flavors and minor articles will be needed in small lots only, unless there be a special run upon a single line, while others will be found useful in many ways. Cudbear gives a color not readily changed; soap bark tincture is a ready emulsifier, and handy at the soda fountain the year around; tincture of citro-chloride of iron every store must have; purified liquorice makes a syrup for stock, and is useful in many mixtures of every-day demand; talcum offers a base for elegant toilet and infant powders to him who will but exercise his wits a little.

In the formulary there are sixty-seven elixirs founded upon the foregoing list, ten more which use aromatic spirit, and four which are made up specially; dropping the last, this leaves seventy-seven which are quickly and easily built, because the care and trouble of percolating, of selecting fine oils, and the time necessary for developing flavors, a step as valuable here as in the perfumer's business, are all concentrated upon *seven main pillars*.

The entire demand for elixirs is based upon palatability, and soon after experiments commenced on them it was discovered that bases would need to be separated from immediate work, not only for the reasons given above, but also to secure uniformity; because duplicate samples from auxiliary societies using the distinct formulary system, would not in many casas agree with each other, nor with trials made by the central force as to flavor and appearance—partly because of the varying time the samples might have had to ripen, and also for the reason that necessary quantities of essential oils and color were mostly added in drops and minims from ordinary bottles as obtained from the wholesaler, with apparently but little thought of variations sure to occur from gradual change.

Hence attention is called under compound spirit of orange to the absolute need of caring for fine essential oils, that no odor of turpentine shall develop; in this particular case fresh oils can be mixed to make orange spirit and that stocked in bottles, one of which will produce aromatic spirit sufficient to keep a little ahead of ordinary demands for a month or two. In this condition it keeps, if cool and protected from light, and ripens to an entirely different flavor than can by any possibility be made extemporaneously from the aromatic spirit, thus always fine and even. One pint will, over night, furnish four of elixir, which for flavor, experts say, has never been excelled.

The Pharmacopœia of 1880, by the process of spreading orange oil over cotton as a separator in making elixir of orange, deliberately invited oxidation, and a quantity of it cannot be made without showing turpentine in its odor.

The foregoing statement as to ripening, applies also to adjuvans, curacao and taraxacum compound, particularly to the latter, although each should be kept at least four months ahead, as the product is correspondingly finer. Taraxacum compound by that time is a most elegant cordial, as different as can be thought from the fresh made, and that from fluid extracts will never gain the same condition.

Finding these things true by trial and not upon speculation, stock bases were used thereafter whenever possible, and it would seem that some pretty strong facts should be presented by those who now wish the contrary, rather than statements of personal wishes.

In adjusting processes, every elixir here represented was originally made in samples with different bases for comparison, and that selected which furnished the best covering—meanwhile seeing that the road was made as easy as possible, but not sacrificing everything to convenience. By these means it was soon found that we were far ahead of anything which could be done by the use of one basic elixir.

A goodly share of the first work consisted in analysis of various preparations then in demand, and a series was kept up while the working term continued; the results often looked very strange compared with what we had become accustomed to see upon labels and circulars.

The next step was to arrange formulas based upon the knowledge thus gained and upon the demand, with care to have materials represented present in the finished product, and also as pleasant to eye and tongue as possible under all the pressure of circumstances.

Aid was also immediately asked from societies, associations and committees throughout the land, and in every instance all information gained by these pioneers was gladly furnished, while many local associations prosecuted their work anew and reported improvements or new designs wished for.

The nucleus, or working committee, consisting of some twenty gentlemen appointed from near-by societies, meeting in New York City each week for two years and more, had auxiliary committees and corresponding members in every part of the country where pharmacy held foot hold; every word or suggestion or formula from any of these received immediate attention. Samples coming with a formula were given to two or more of the local committee to try, and each separately to return such trials with improvements, if possible; then all results were brought before the full committee for criticism as to color, smell, general appearance and taste; following this came a test of time, to determine whether good or ill results followed.

Through these tests and trials, part of which were for the elimination ot personal idiosyncrasy, the 435 numbers came off victorious, while many a pet recipe and time-honored method came to grief. No favor was shown, and probably the various members of the nucleus committee suffered in this respect as much or more than others.

If the many representative gentlemen from auxiliary societies, and others interested, who took occasion to call in New York and see the work going on, glance even at the many closets full of samples, and watch the care applied at every step, it can be freely stated that none will question the accuracy of the above sketch regarding details.

The compilation as a whole contains such articles as by consensus thus gained, seemed most needed by the general trade at that time. Had all applications for enlargement been listened to, a volume many sizes larger would have been required, and it seems from the yearly reports since, that additions or eliminations are not yet desired in quantity. Of course six years have passed since the first publication, and the mere fact of this accurate manual being in the hands of every active pharmacist, has made the proprietors shift to other lines, dropping in new productions the word elixir; and we may need to add new lines of liquors, glyceroles, peptonates and others of immediate popularity, and others, as in this edititon, tentatively, to meet possible coming wants.

Some formulas may have already become antiquated or the article itself be no longer needed; yet when the start was made to have an unofficial guide, a very large part of the intention was to furnish such for some old things which have been clipped and scissored out of all recognition, or lost in old books which but few have on hand; and it must also be remembered that this little manual is expected to do some preliminary experimenting, to offer for trial schemes and methods and recipes, not yet exactly solid in their mercantile foundation. For instance, could a few abstracts have been pushed beforehand for trial, as some typical working procedures were for oleates, a line of really fine galenicals probably would not have collapsed so utterly. It should be our advance guard, and needs not the solid alignment and heavy conservatism of the Pharmacopœia.

AS REGARDS SINGLE FORMULÆ AND CORRECTIONS.

Two bespeak considerable attention, from being much in use and frequently complained of.

No. 63. Elixir Phosphate of Iron, Quinine and Strychnine.—In the first place, this was not intended for long keeping, nor to be a stable compound, and a foot-note distinctly states that the mixture will not make a clear solution with water. Long standing induces crystallization of quinine as citrate, which salt is not very soluble, and this is aided by the *action of light;* yet a sample of this sent with others by the Working Committee at the close of its term for exhibition at the meeting in Detroit of '88, was kept afterwards in a cool and dark location, and opened in the summer of 1892, after four years, is thus described by Chairman Diehl as being "clear, of good odor, but with a decided precipitate." From a line of samples made by A. B. Stevens, of Detroit, this after one year had deposited a much larger crystallization than the older one, but conditions are not given.

It so happens that in my own work, this precipitation has never occurred, though samples have been kept three years, possibly because always relegated to a dark closet, where the temperature varied but little the year round, while for general delivery stocks have never been made up for more than a few months ahead.

This formula is one of those constructed after several analyses made during a number of years, which greatly varied, therefore another was added later, appearing as No. 65, which keeps well, and is miscible with ordinary liquids.

Of the many variations offered upon No. 63 since its publication, nearly every one coming before the sub-committee, of which I was a member, was made up and reported back with samples to the main body, to undergo the usual course of trial: some defect was found in each, which was greater than any connected with this.

Since that time I have found that a slight change in manipulation and a small addition of glycerin at the proper steps during the operation, retards these changes, which, however, are sure to come, giving thus a longer life to the elixir and rendering it miscible with water.

Alcohol	1½ fluid ounces.
Aromatic elixir	10 fluid ounces.
Sulphate of strychine	1¼ grains *in solution.*
Hydrochlorate of quinine	128 grains.
(Dissolve by agitation, and add:)	
Glycerin	2 fluid ounces.
Phosphate of iron (U. S. P., 1880)	256 grains.
Water, hot	360 minims.
(Dissolve and add:)	
Citrate of potassium	32 grains.
Glycerin	120 minims.
Aromatic elixir	1½ fluid ounces.

Add to the first, and bring if necessary with aromatic elixir to 16 fluid ounces.

Quinine either as alkaloid or salts is incompatible with phosphate of iron (U. S. P., 1880); the slightly alkaline solution of No. 63 was devised to hinder what must happen, and has succeeded quite well.

Reference to Proceedings of 1892, Fennel, "Syrups of Phosphate of Iron, Quinine and Strychnine;" L. F. Stevens, "Phosphate of Iron and Phosphoric Acid;" W. H. Wearn, "Darkening of Syrups containing Phosphate of Iron, U. S. P.;" and of 1893, J. D. Fromm, "Scale Phosphate of Iron, and its incompatibility with Quinine," will show some exhaustive work done during three years in seeking the source of these peculiarities; each author, though with distinct title, and endeavoring to elucidate specific difficulties, yet followed parallel lines, which proved of great value towards clearing much of the fog surrounding hitherto these and similar mixtures, yet the first three were not aware of other articles in the same line to be presented at this session.

Fromm then had, with other literature, a foundation upon which to base thorough analysis at various stages when these chemicals are together.

In the Proceedings of 1890, page 137, is offered an elixir of three phosphates, which might come into use if such seems actually desired by physicians, because being exactly what it claims. Considerable work will still have to be done to get it pleasant—in other words, to find a good cover to the underlying taste. And it must be remembered too that this is exactly and totally opposite in many characteristics from the elixir of the National Formulary or any other on the market, being acid from free hydrochloric acid left in the decomposition, which is necessary to keep the insoluble phosphates in solution.

Nat. Form. elixir No. 63 is alkaline from citrate of potash, added in order to prevent the precipitate, made by addition of water, as long as possible.

The second, in regard to complaints, is

No. 370. Compound Syrup of Hypophosphites.—This is also one of those where materials given in the formula actually appear in the finished preparation, and not, as analysis showed of some perfected packages, that the label or circular carried most of the medicinal value, and has correspondingly taken well with our physicians.

The N. Y. B. original had a slightly different procedure. The objectors then took the same ground as now, that it was too much trouble to make solution of hypophosphite of iron; so in endeavoring to give up a little to these people, the work was bunched at one operation.

By some accident, during proof-reading and final editing, the latest recommendation from the sub-committee in charge of 370, 63, and several others, was overlooked in the directions.

No. 370, as it stands, does very well if kept from direct sunlight. A. B. Stevens found a year-old sample in very good order, without much care, and from the assortment kept four years, in a sample of this syrup having been in the dark, Chairman Diehl found but slight disturbance.

The change in manipulation is very slight, but eliminates that which by many is considered as luck. The first section is not changed, which reads as below.

"Rub the hypophosphites of iron and of manganese with the citrate of potassium and citric acid to powder; add one fluid ounce of water, and warm a few minutes, until a clear greenish solution is obtained. *Do not boil*, for there will be some sediment insoluble at any heat."

The second section is slightly changed.

Triturate the other hypophosphites and the hydrochlorate of quinine very thoroughly with an *equal weight* of the *sugar*.

Into a dry bottle place the remainder of the sugar, drop upon it the tincture of nux vomica, and shake well. Then add the dry trituration, and again shake until the contents are thoroughly distributed. Upon this pour the warm iron and manganese solution, and again most thoroughly agitate, then water sufficient to give the required volume, and dissolve by occasional gentle agitation, or by means of percolation, which is preferable.

By this means the reacting chemicals are kept apart until syrup has formed which retards decomposition. There is a strong feeling among the best therapeutists, that the nearer a compound mixture is to chemical union without actual condensation, the quicker will action be when taken; in other words, that as in chemical work, the nascent condition is often of great medicinal value, for somewhat the same reason. Tincture of nux vomica is used, as the more gentle and continued tonic effect is obtained, rather than the active stimulant of strychnine. When that stimulant is necessitated, then some of the elixirs of strychnine in various combination are in order, and formulas are given for these ad infinitum.

No. 54. Aromatic Elixir of Yerba Santa.—This formula, as it stands, furnishes a better extemporaneous cover to the taste of quinine than anything yet attempted for that purpose. With this elixir quinine may be mixed to a thick paste and still not be very distasteful, while two grains per fluid dram is scarcely noticed at all. Meanwhile the flavor improves upon standing, the mixture, *unlike those containing caustic alkali*, growing thinner and lighter in color, and also more agreeable to taste, owing to a combination between the quinine and the native glucosidal principle. This combination is insoluble in saliva, but quickly broken up and made active by the acid juices of the stomach. I preserved quinine mixtures of various strengths for time test, and found that after a few weeks this glucoside had dissolved the quinine, leaving a small amount of debris at the bottom of the bottle, consisting of inert extractive matters and traces of the minor resin.

The method of freeing from objectionable matters, resins and such, and after touches for yielding a handsome elixir, is exceeedingly simple. These are precipitated in partly aqueous menstruum, using pumice as a distributor, and arranged to give as little side work as possible, through use of stock preparations, and the instructions given are so clear that any one drilled in making tinctures can by no possibility get astray; but it cannot be produced in a hurry.

For strictly extemporaneous purposes, more syrup may be added to increase the specific gravity, and thus better suspend the quinine.

As in many other cases, an alternate formula is given for those who must use a syrup, such is found in No. 361, which however, contains an excess of sugar which should be reduced.

The formation of the elixir and the syrup is radically different. In the former, the bitter resin is precipitated upon the first cotton filter, leaving the covering power of yerba free, while in the syrup, following the line of some goods upon the market, the resin is saponified by caustic alkali, and the resulting soap left in the mixture to increase the already nauseous taste. Those who may desire to further experiment, will save much time and labor by looking at Proceedings of A. P. A., 1888, p. 89. "Notes upon trials for a Quinine Mask," by Luther F. Stevens, where this subject has been gone into in great detail for the benefit of future workers.

Since this formula was planned which is based upon the report of Mohr in 1879, A. Quirini, a chemist in Germany, claims the isolation of the principle from yerba which he found covered quinine well. He considers it an acid, but the chemical formula put forth hy himself does not show an acid at all, but more nearly the glucosidal matter of Mohr. Quirini gives it the formula $C_6H_3(O.C_4H_7O)_2—H_2O$. The opinion of the late Professor Maisch* was, that it belonged to the phloro-glucins.

We do not ask of druggists the long job of separating this, nor the paying of a high price for the concentration, as we get sufficient in a flavored liquid to answer all ordinary prescription needs. A better flavor may yet be formed, or a totally different combination arrived at, but most improvements so far offered are upon the line of percolating ground drugs with a caustic solution, or simply an imitation of the N. F. formula, No. 361, somewhat stronger and held in glycerin for dilution by syrup when needed. And against each of these, or any upon a similar line, the objection is to the saponification, which is a very poor pharmaceutical method to cling to when a better is offered, especially as No. 54 is superior for the specific purpose than any made upon the causticising plan, by more than ten to one.

No. 253. Compound Mixture of Chloral and Potassium Bromide.—Here quillaia is used as the suspending agent for a resinous extract, by which means it was found possible to send it out in a nearly aqueous strongly alkaline solution, where soothing medicinals can be exhibited without the exciting effect of alcohol, of which latter there is but half a fluidounce in sixteen. The mixture was added at the request of western representatives upon the committee, who were very desirous of something of the kind which they could recommend as containing the dosage stated.

Several gentlemen hold that the formula is a failure in every way. My own experience is to the contrary, possibly because always using the English cannabis extract, and Chairman Diehl found a four-year-old sample in good order.

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* See "American Journal of Pharmacy," April, 1888.

A little liquorice in some shape added to this will improve the taste, and also aid in suspension of the cannabis extract, while rendering it slightly thicker.

No. 254. Chloroform Anodyne—" Mixture of Chloroform and Opium." —While this was on its stormy passage through the nucleus committee, every other formula in print or which could in any way be gotten hold of was also given trial, and as scarce any were alike, tables were prepared showing graphically the great variations and inconsistencies existing, samples of the original were analyzed and found not to agree with any alleged analysis then on hand, and to be as wide apart from imitations as the latter were among each other. A survey of these facts finally decided a *radical departure from usual form*, and a scientific modernly-built emulsion is offered.

The chloroform and resinous extracts being emulsionized by means of tincture of quillaia and liquorice solution, belladonna was added at the request of many well known physicians, and deodorized tincture of opium, because it can *always be obtained of definite strength*, and is not, as many anxious alkaloiders claim, an uncertain compound except by the connivance of the party using it, but also and principally for the reason that it is more of an anodyne and less soporific than morphine alone. By leaving out morphine salts, acids are eliminated entirely, to the horror of conservatives, and by emulsification but little alcohol is needed, the latter fact alone being a large recommendation to many prescribers. It is a smooth and not unpleasant medicament well suited to the cases for which the proprietary article was brought out.

When more alcohol is needed or greater pungency desired, No. 41 is advantageous, having somewhat the same characteristics.

It is quite noticeable that nearly all improvements or new methods offered since 1888 are based upon ancient literature, and contain some form of acid, a morphine salt, and a large percentage of alcohol. One which may be taken as typical, and was offered through the medium of the Committee report of last year, has nearly one-half alcohol, close upon ⅛ grain of sulphate of morphine, and four minims of hydrocyanic acid to each fluid dram. If that can be considered, by those who are supposed to be professional, as *anodyne*, then I make a great mistake in the meaning of the word.

There are steps backward.

Not satisfied with endeavoring to raise chlorodyne to an alcoholate, an improvement was offered in 1893 to the alternate and stronger No. 41. Even that is not strong enough for the stimulant takers, and therefore creosote is to replace cassia oil, and alcohol instead of one-half is to be brought up to nearly the whole menstruum. Now herein lies the serious fault of most would-be revisers of many formulas similar to this : in place of tonics and anodynes they would inject the most active of stimulants and excitants, and in quantities, too, leaving nothing to meet other emergencies.

That which the original Committee worked for as much as any one thing was to keep down the percentage of alcohol in every case to the lowest possibility, and in consequence the strongest of National Formulary elixirs has less spirit than has paregoric.

No. 67. Elixir of Gentian.—The solid extract was chosen for making this, after trying fluid extracts, concentrated compound infusion, and many other schemes, because it gives a much smoother and far more pleasant product. It has become somewhat well known of late years that water and glycerin will extract all the tonic matters of gentian with but little of bitterness. The committee was inclined to give a special process for this on that basis, but finally settled upon this for convenience, and as being nearly as good.

Some are now wishing it to be made from fluid extract, apparently supposing that bitterness is the main essential, which possibly is not to be wondered at, upon empirical grounds, as all old-fashioned "bitters" were supposed to have gentian as their main ingredient.

No. 27. Elixir of Valerianate of Ammonium.—Various plans are out for radical changes in this; some are about one-half the strength only, notably one offered to the Committee in 1893, where the whole present flavor is done away with, and one from olden times, not nearly so effective, substituted, and with it a much more operose and odorous working method.

The formula now standing starts with the ammonium salt, in place of making it from valerianic acid, and gives directions in a foot note how to keep up the ammoniation, and thus lose nothing of strength from evaporation, while the combination of flavors covers the smell of valerian better than anything before or since thought of. The effectualness of this can be shown for trial by simply reducing the valerian strength *one-half* (which is about what some of the new would have after a few weeks), when the odor is scarcely perceptible even upon opening a long-stoppered package. The cudbear used gives a much better holding color than any possible from carmine or its associates. An even worse one is proposed, where, instead of ammoniating from time to time to keep the valerian strength, the plan is to *skim* off the floating acid.

As far as common sense goes, these two formulas will rank well together.

Nos. 114 to 123. Emulsions of Cod-liver Oil and Flavors.—Mucilage of Irish moss was recommended for several reasons: it is miscible with alcohol, more ready in emulsifying, is much cheaper than acacia, and more permanent, and although the oil globlules are somewhat larger, yet the whole is more digestible.

Other formulas were also given because pharmacists of different localities have often to meet varying conditions, and that is the chief scheme of the work to assist the retailer. Customers' tastes vary greatly, so instead of tying every one hard and fast to one flavor, which might not suit half the population of a town, a number were offered enabling special patients and physicians to be catered to, and thus draw trade from perfected packages, which in this line are of less value than fresh-made goods.

I have seen a number of stores which, by reason of these hints and suggestions, have been able to free their shelves from long-carried burdens of a similar kind, and now only need to keep one or two makes, and these possibly in sixths of a dozen.

No. 202. Solution of Acid Phosphates.—A number at different times have wished to displace this by mixtures variously made up from phosphoric acid and other ingredients, but as it has come more generally into use these are fewer.

Dr. Tscheppe made out this working edition from the original German formula, made public many years before copyrights were obtained for a weak dilution. It holds in natural combination the minerals necessary to bone structure, as acid phosphates in an excess of diluted phosphoric acid, and is much cheaper than any mixture corresponding in strength and form.

For practical purposes in a pharmacy, the alternate process of percolation meets every need, and is simpler than keeping a special press; the product is much stronger than that we have been accustomed to handle, and on that account needs looking after, or too much may be used either at the prescription or the soda counter. For those with a large soda trade, this is one of the most satisfactory and paying processes in the whole book.

Nos. 290 and 390. Warburg's Tincture and Pills.—To many fault-hunters it has seemed strange that the relative amount of aloes should be so different in these two formulas, which are revisions upon modern lines of a remnant from the dark ages of pharmacy. This variety was purposely made upon the request of many physicians, because weak patients who needed the febrifuge could not always stand the large quotum of aloes as originally displayed, but this could easily be exhibited in pill; since then Pill Warburg without aloes is as frequently called for as the complete, showing that the feeling has grown in considering the heavy purgatives as not always an essential.

By oversight, foot-notes intended to have been introduced to each number, explanatory of the situation, were overlooked.

METHODS OF INTRODUCTION.

In our own city we have been quite successful in this matter. The druggists themselves thought well of it from the first, and have kept talking in every way possible to their clientage. Our local Society, soon after the publication, purchased the Physicians' Manual, compiled by ——, and mailed a copy to every doctor in town, of whatever school, and also to every drug store, regardless of whether the proprietor happened to be a member of the Kings County Pharmaceutical Society or not. This was followed by communications from time to time regarding its advantages in the publications issued monthly by the Medical Society of the County of Kings, and occasionally getting some talk at the Medical Society meetings regarding it, as several gentlemen were members of both. Other means were not neglected. Whenever a chance occurred to praise it up it was accepted, until the majority of its popular articles are accepted as standard, and the work still goes on to the advantage of all.

"DO THE SO-CALLED ELEGANT PREPARATIONS OF COD LIVER OIL, FROM WHICH THE OIL HAS BEEN REMOVED, POSSESS ANY THERAPEUTIC VALUE?"

BY HENRY A. STEARNS.

Among the list of queries sent out by the Scientific Section of the American Pharmaceutical Association, was one having the above title. Being somewhat familar with the subject, as the result of over two years' work among physicians with a preparation coming under the above title, I feel prepared to answer it. I have conversed with over two thousand physicians on this subject, in the States of Florida, Illinois, Iowa, Colorado, Utah, California, Georgia, Indiana and Michigan. I have seen the results of careful hospital, clinical study, with one of the preparations referred to, and have come in contact with many people treated.

Our old standard works on Materia Medica and Therapeutics state that cod liver oil is a most easily digested and most readily assimilaied fat, and that its reconstructive properties are simply those of a food.

I find, however, in my field of work, that, at a conservative estimate, fully 98 per cent. of the physicians that I interviewed on the subject of cod liver oil, claimed that it produced digestive disturbance in from 60 to 80 per cent. of the cases that required its use ; and while, strange to say, butter , cream, properly cooked fat pork, and pure prepared olive oil, could be taken by the majority of patients, and be digested and assimilated where cod liver oil could not be tolerated. The latter caused eructations, nausea, diarrhœa, etc., even when administered in capsules, so as to leave no unpleasant taste in the mouth. This would indicate that there are other fats more easily digested than cod liver oil, and that the theory which relates to its building up properties is hardly sound.

It is also the experience of the majority of physicians with whom I have conversed on the subject, that cod liver oil, though more difficult of digestion than some other fats, does, however, build up patients in strength and weight more rapidly than any other fat. It often builds up, where other fats that cause little digestive disturbances fail. Furthermore, where there is any improvement in the patient's condition, it is invariably noticed that an increase in the patient's appetite occurs, which precedes any increase in strength and weight. During a six weeks' course of treatment with a 50 per cent. cod liver oil emulsion (tablespoonful three times a day), patients often increase in weight from five to twelve and sometimes as high as twenty pounds, though not consuming during that period of time quite two pints (about 2 pounds) of pure oil. On the basis simply of a food, how can two pounds make five, to say nothing of twenty pounds increase in weight?

The claim that cod liver oil is the most easily digested of all fats, is not substantiated by the experience of the majority of physicians that I have met who prescribe it extensively. Neither does a comparison between the chemistry of cod liver oil and the fat of pork, show anything to indicate that cod liver oil is superior to any other fat as a food.

One of the most eminent investigators in the world in his special field of organic chemistry is Dr. Armand Gautier, Professor of the Faculty of Medicine of Paris, France, a recognized authority on leucomaines, whose valuable work, assisted by his associate, Dr. L. Mourgues, begun in 1885, has added so much to our knowledge of the subject, by a careful chemical and clinical investigation of cod liver oil. More than four years were devoted to their study of the subject, which resulted in the discovery and isolation of seven different alkaloidal principles from cod liver oil, aside from its minute quantities of iodine, bromine and phosphorus, which were previously known to exist in it. These active principles, butylamine, amylamine, hexalamine, dihydrotoluidin, aselline, morrhuine, and morrhuic acid, were each carefully tested on animals, to ascertain their physiological action. The result of the work of these investigators was embodied in an exhaustive report of forty pages, and brought before the Academie des Medicines in 1890.

The investigations of these eminent scientists proved that the alkaloids, morrhuine, morrhuic acid, and the other active principles found in no other fat but cod liver oil as far as known, have marked power to increase appetite and promote the assimilation of food. The theory for their action is that they remove waste products from the tissues which are present in unusual quantities in all low conditions of the system, such as phthisis, scrofula, nervous debility, rheumatism, la grippe, convalescing from fevers, etc. They stimulate the nervous system, and cleanse the system of effete matter. The organism, therefore, it would seem, calls for something to replace what has been taken away, so that the appetite may be increased and food assimilated. Butylamine and amylamine act as diuretics and diaphoretics, and thus undoubtedly play an important part in the reparative action following the exhibition of the combined active principles of cod liver oil.

The work of Drs. Gautier and Mourgues has been carefully verified physiologically and clinically, by M. Bouillot, of Paris, France, by work in the Paris Hospitals, a report of which was brought before the French Academie des Sciences, Nov. 15th, 1892

Independent studies with the combined active principles of cod liver oil have also been carried on by Chazeaud, Germain See (Professor of Classical Medicine in Hotel Dieu Hospital), Lafage and E. Locksy, all of whom are eminent and well known French scientists.

Dr. E. L. Shurly, of Detroit, Mich., devoted several months' careful clinical study to the combined active principles isolated from cod liver oil, in Harper Hospital of Detroit, and reported them as being most powerful and satisfactory. An extended report of the investigations was published in the "Harper Hospital Bulletin," April, 1893.

It therefore stands to reason that if the true reconstructive properties of cod-liver oil can be isolated from the fat and held in permanent solution in a suitable medium, which without deterioration can be administered to patients, such a preparation must have therapeutic value. In the latter half of 1892, these alkaloidal and active principles, as described by Drs. Gautier and Mourgues, were made according to their methods, and added in definite proportions to wine. This preparation was placed in Harper Hospital, St. Mary's Hospital, the Woman's and Foundling's Hospital, and the Children's Free Hospital, all of Detroit. and in the University of Michigan Hospital, of Ann Arbor, Mich. It was also placed in the hands of a number of the prominent physicians for exhaustive clinical study, to ascertain whether it had any therapeutic value, and what its value was in comparison with the oily preparations of cod liver oil. The clinical study was carried on by Drs. E. L. Shurly, W. P. Manton, David Inglis, A. N. Collins, W. R. Chittick, Geo. Duffield, C. W. Hitchcock, G. S. Banks, R. C. Olin, O. Le Seure, E. L. Orleman, of Detroit, and Drs. Herdman and Martin, of Ann Arbor, Mich., all widely known, and by many other physicians of Michigan.

The result of the clinical study, covering over five months' time, and over eight hundred patients experimented on, demonstrated that a solution of the active principles of cod liver oil in wine can be taken and retained by fully 90 per cent. of the patients that use such a preparation; and that it will increase the appetite and promote the assimilation of food, and consequently increase strength and bodily weight in a more marked degree, in the majority of instances, than any other preparation of cod liver oil.

Reports of clinical studies can be cited by the hundreds, showing increase in patients' weight of from three to thirty pounds by a course of treatment with a solution of the active principles of cod liver oil in wine, and in many cases where pure cod liver oil emulsion and various wines and spirits used as stimulants in addition to the oil, produced no effect, or but little improvement in the patient's condition. In some cases the improvement was only slight under the oily regimen, and very marked under the treatment with the solution of the active principles.

The career of any new therapeutic agent, notwithstanding the utmost care of the introducer or discoverers to have each step taken, and each claim for superiority, carefully verified by a number of capable and disinterested investigators, is necessarily attended by bitter opposition and misrepresentation. The unwarranted assertions that the reconstructive property is only the oil itself; and again, that the active principles of cod liver oil are poisonous and are the products of decomposition, are not true. The first assertion is fairly met and answered by the results of the work of disinterested investigators quoted in this paper. The second is answered by the fact that any powerful therapeutic agent, such as strychnine, morphine, etc., is necessarily a poison in improper doses, but that does not prevent their being valuable medicines. And lastly, M. J. Bouillot has found morrhuine, and the other alkaloids referred to, in the cells of the cod liver itself, where the material was so fresh as to preclude any possibility of decomposition having taken place.

MINUTES

OF THE

SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.

First Session.—Friday Morning, Sept. 7.

The Section was called to order at 10 o'clock by the Chairman, Dr. R. G. Eccles. In the absence of the Secretary, Mr. H. Kraemer was upon motion of Dr. Whelpley elected to act as temporary Secretary.

The Chairman, having invited Dr. Whelpley to preside, proceeded to deliver his annual address as follows, which was attentively listened to and warmly applauded :

Fellow Members : The histories of both legislation and education are replete with illustrations of the baneful effecfs of too hasty action, and equally full of cases where deferred action has proven quite and sometimes more injurious to human interests and welfare. Deliberation not guided by some fixed principle is valueless. As well might we act by the toss of a penny or the fall of a die--by following blind chance, in a certain proportion of cases the right is sure to turn up. The crude methods of the past have all been of this kind. By trying first one scheme and then another, by and by they were sure to hit the right way. In a choice of a hundred roads only one of which is right, to keep trying is to strike the right one sometime.

To keep making such trials at every new series of cross-roads in human progress is an obvious waste of effort, to say nothing of the suffering entailed on millions. Yet this is the very method that for ages has been pursued by the race. Every permanent act of legislation is a success reached after numerous failures. In trying to go every way we occasionally have gone the right way, and the outcome being good it has been adhered to. Thus through the ages increment has been added to increment, till at last has grown up our whole body of laws. Among intelligent people so wasteful a method should give place to a more scientific one. An analysis and comparison of successful with unsuccessful efforts at legislation shows unequivocally that the element that renders the former fit and enables it to survive, and the absence of which causes failure in the latter, is equity. Just legislation—if obviously just—lives. Unjust legislation—when obviously unjust—quickly perishes. Unless the justice is obvious, even the best of laws may perish until men become sufficiently intelligent to perceive their value or to see that their results are good.

The constant foe of equity is selfishness, and unfortunately for the world the more selfish a man is the less conscious does he seem to be of this defect in himself. Ignorance and selfishness, while not always constant companions, are very likely to be. Most legislation of the past has been inspired by a hope of self-aggrandizement, and not by any desire on the part of anybody to be either generous or just. To aim at ideal justice has been until lately considered visionary speculation or downright crankiness. As a race we have been, therefore, sowing the wind and reaping the whirlwind. When we stop asking whether any given change will benefit us individually or as a class, and instead of this seek to know whether it is likely to benefit all the people, we are on the road to true scientific legislation. This is equally true of education. Society in its organized form must be the first and main beneficiary of good laws and good education. The education that is most likely to bring the best results to the public at large is the education our colleges should always seek to give. No man really works for himself. Most of our suffering comes from the belief that what we are doing is merely earning a living for ourselves. The world can never be free from misery until we discover that it is our duty to take thought for to-morrow for the race, and cease to take thought for to-morrow for ourselves. We want to know what kind of education will serve us individually best. The result is the conclusion that we will secure the kind that can be had most easily or at the minimum cost of time and money. We lose sight of the fact that all this is unjust to those we propose to serve. Teachers who lose sight of justice press on students lessons they know such students can only master after the fashion of a phonograph or a parrot. They selfishly hope to appear important by seeming to teach them a great deal in a short time. Education is in no sense a loading up of our memories with facts and theories. A phonograph can be loaded that way. True education consists in having certain favorable *habits* of thought and conduct fixed upon us.

To those who have never analyzed their own movements this statement may seem questionable, but to the man who has watched himself for a few days it is a self-evident fact that cannot be doubted, let alone disputed. We are all creatures of habit, and even our thoughts flow in channels previously made for them. To deviate from these channels requires a special effort we are only occasionally willing to make. The older we are the more difficult it is for us to get out of the rut into a new path of thought or act. Mental effort out of the habitual path of thought is tedious and wearisome. This is why good advice, even when the recipient knows and acknowledges that it is good, is rarely followed. The habit has never been established, and the effort to mentally recall and act upon the advice is more than we are usually willing to give. All kinds of education obey this law. The mere learning of anything is a useless and, may it be added, sinful waste of time unless we simply learn it for immediate use. Such things must be fixed, and in a way that they are sure to come up at the right time. The situation should suggest the thought: Why can one man freely use his knowledge at the moment it is required, while another recalls his facts too late for use? The answer is a simple one. The former learned his facts while doing the acts, the other acquired his facts from a book or books without ever having performed the act, or by performing it at a different time. Do you wish to be able to use a certain formula for making a fine elixir? Do not think that you will be able to recall it a year later by memorizing from a book. Make it a few times and you will be master of it. The fact and the act are thus established side by side in your memory, a habit has been established, and you are in true possession of it.

Nothing short of repeated experiences can constitute education. All short of this is cram. But why do we all denounce cram? What student can avoid it, as matters are at present conducted? A properly educated young man could not pass the usual examinations with any credit. His habits of thought would be such that not questions, but conditions, would best call up his facts. Set him to make an analysis, an elixir, a pill, a tincture, an extract, an ointment, an emulsion, and he will show his education in habits of research, habits of thought, habits of handling his apparatus, habits of cleanliness, habits of care, and habits of precision. Next try the crammed young man who sails to the top in some of the examinations I have seen, and he will be awkward, bungling, dirty and unsuccessful. The properly educated young man would not have had one-tenth part the necessary time to master the wide field covered by the questions of an examining board. The college that trains its students into habits of research, habits of thought, habits of handling apparatus in a proper manner, habits of cleanliness, habits of care, and habits of precision, is the one that fits its graduates for the requirements of the race. Only such students can give to humanity the best fruits of a progressive age. They may know far less—as some of us now reckon knowledge—but they will have a foundation laid that will enable them to far outstrip the mere memorizer in a few brief years. They will be cleanly, because they cannot now be dirty; they will be thorough, because their souls would rebel against anything less. They have habits that stick by them for the rest of their natural lives, and carry them higher and higher in knowledge and skill as the years roll past. It is a sad thing to see good material spoiled by bad treatment, and yet such spoiling is going on all the time.

The higher institutions of learning are slowly coming to proper methods of training, but they cannot reach any great degree of perfection until the kindergarten system obtains in the primary schools. Our best pharmaceutical colleges are rapidly reaching toward the same goal, but the system of examinations is hindering them from reaching it quickly. The laboratory, not the lecture, gives the right kind of education, providing haste is not present to mar the work. Let the examination be made by laboratory test and not by written or printed questions, and far better results will at once appear. Less —yes, far less—will be taught than at present. Give the marks for cleanliness, skill, thoroughness and accuracy of work, not for replies to queries. Put cleanliness and care ahead of all else. If a young man has these, the rest will come in time.

Such training will necessarily, at the start, be repugnant to both student and teacher, because it will require greater physical and mental effort on the part of both than does our present system. It will be slower in showing results, so that less brilliant displays can be made to a world that still demands that the memory be crammed. Do not, please, mistake my meaning here. The present system already has much of what is here asked for, but my cry is for more. Give us graduates with well established habits of the right kind in greater perfection, and do not force them to deplorably and for life cripple their intellects by cram. Justice to the sick and suffering, to whom they will be ministers either of mercy or of woe, according to their training, demands nothing less than this.

In selecting a college of pharmacy in which to gain an education, students should be left free to make their choice of the best equipped institutions, and not by menace or even an unintended appearance of menace, be forced to enter one they do not care to attend. Here, again, equity clamors for a hearing. It is not just to any young man to establish conditions that cause him to think that he cannot hope for justice by boards of pharmacy unless he goes to a certain college. No young man is free to make a choice who thinks that a board of pharmacy will favor him if he has attended a certain college of pharmacy one or more terms, and, by accident or otherwise, is unable to finish his course in the college. To feel that being on friendly terms with the professors by a winter's attendance at the college, a simple explanation of inability to raise sufficient money to finish his course and take the degree will be a passport through a board of pharmacy to a license, is a form of menace that must work evil; or, having some money, to fear that a board of pharmacy will deal harshly with and compel him to take one or more courses in a certain college, is a condition of affairs that this Association should set its stamp of disapprobation upon. It is useless for such college or such board to assert that no such menace obtains by any intent of theirs. It is useless for them to declare that they deal with equal fairness by all. It would be equally useless for them to bring proof positive of absolute impartiality on their part. Boards of pharmacy and colleges of pharmacy should be completely dissevered. To have the professors in the college and the President, or other high officer of the college, belonging at the same time to the board of pharmacy as a member thereof, is so much against justice that it would, if carried to the proper tribunal, probably lead to the annulment of the charter of such an institution.

In my address of a year ago, reference was made to the injustice of our present patent laws wherein they relate to medicines. No recommendation was then made, and the matter was passed by unattended to further than giving it some discussion. A paper on the subject again appears, written by a well known Chicago pharmacist. Some action of a definite character should be taken by us. We should endeavor to have the law so amended that no patent would be granted for any new remedy unless our supply of it is manufactured in the United States. We should also endeavor to do away with all patenting of *substances*, and substitute therefore only the granting of patents for methods of manufacture. Unless this is done we must continue violating the very principle upon which the whole of our patent laws is founded. There is but one justification of patent laws at all. They exist because it is believed that the race is benefited in the bestowing of such a monopoly, in that it encourages further invention. But to patent substances is to hinder invention and check progress. The name by which any substance is patented should be public property, and never allowed to be used alone as a trade mark. Such amendments as these once made to the existing laws would be just to the patentee, just to the pharmacist, just to other inventors or discoverers, and just to the sick. For these reasons it is your present Chairman's desire to see you adopt some definite plan by which to get the matter before Congress.

On motion of Dr. Bartley, the Chairman's address was referred to the Committee on Publication, and on motion of Mr. Sheppard, the recommendations contained in the address were referred to a committee of three.

The Chair then appointed the following gentlemen on this committee: Messrs. Alpers, Ford and Beal. Mr. Alpers declined, and Mr. Sawyer was appointed in his place

THE CHAIRMAN: The next business is the report of Committees.

MR. SHEPPARD: At the meeting of this Section last year a committee was appointed to take into consideration a resolution offered by Prof. Hallberg. That committee is ready to report.

The following report was then read, and on motion was received.

REPORT OF COMMITTEE ON RESOLUTION OFFERED BY PROF. C. S. N. HALLBERG, AT CHICAGO, AUGUST 17, 1893.

At the meeting of the Section on Pharmaceutical Education and Legislation in Chicago last year, the undersigned were appointed a Committee to consider and report on the following resolution:

"*Resolved*, That the following conditions shall determine what constitutes recognized Colleges of Pharmacy, that is, the requirements for graduation are: (1) Age, 21 years; (2) Experience in pharmacy four years, including time at college; (3) Two courses of at least six months each, extending over more than one year." See 1893 Proceedings, page 277.

As soon as the Committee began to consider carefully the character and full scope of this resolution, they realized that action upon it might be very far-reaching in its effects, upon both the American Pharmaceutical Association and the Pharmaceutical Schools of the country.

They therefore requested that they might have a year in which to consider the matter before making their report. And now that they are about to present that report, they confess to a feeling of deeper anxiety concerning the matter than they did a year ago, and they urge the Association to be very careful in its action on the subject.

While many of us have very strong convictions in regard to the matters referred to in this resolution, we must for the moment allow these convictions to remain unexpressed, and strive to answer the following, which is the only real question now before us: What position should the American Pharmaceutical Association take in regard to Prof. Hallberg's resolution?

The connection between the Association and the schools and colleges is one entirely of courtesy, and in no sense one of judicial authority. Nevertheless, the connection is a very strong one, and the Association on the one side, or the schools on the other, can, very materially, help or retard the good work that all are doing in the cause of pharmaceutical education. Now, what action can the Association take on this subject that will give the most help to pharmaceutical education, as represented in this country to-day? It would seem to be for the best that the Association should be a common meeting-ground for all; that there should be at all times on this common meeting-ground such full and friendly discussion of methods as shall stimulate, benefit and teach, without producing friction or bitterness of feeling.

It is very plain that the Association has no judicial rights to exercise. While most of the active workers in the schools are members of the Association, they are members simply in their personal capacities, and not by virtue of their connection with their schools. Nor, can it be said that the Association is an association of schools. It is simply a body made up of individual members. Therefore, it would seem that the American Pharmaceutical Association has no right to set itself up as a judge of what should be considered a regular, or recognized, or reputable, or good or bad college of pharmacy. Should the colleges and schools of the country, acting in concert, present the question to the Association for answer, then we might, very properly, take a decided position in regard to it. But for us voluntarily to pass a resolution of such a strong and positive character, censuring the course pursued by pharmaceutical schools standing high in the work of pharmacy, would, in the judgment of your Committee, be very doubtful policy.

The Committee, however, believe that the position of the Association is such that resolutions of a suggestive or advisory character, if passed by a two-thirds or three-fourths vote, may be of great help to the various schools, because such resolutions would probably express the prevailing opinions of the majority of the best men engaged in our line of work in this country, and the American Pharmaceutical Association is, practically, the only medium through which such information can be obtained.

Your Committee, therefore, recommend that the resolution offered by Prof. Hallberg be not adopted.

They also recommend that the Association adopt one of the following resolutions provided that three-fourths of all the votes cast shall be in the affirmative:

FIRST RESOLUTION.

Resolved, That it is the sense of the American Pharmaceutical Association that the cause of pharmaceutical education would be advanced, should all pharmaceutical schools that confer the degree of graduate in pharmacy, adopt the following suggestions:

(1) That the standard for admission to the school shall be not less than that required for admission to the public high schools of the country.

(2) That each student shall attend not less than two (2) courses of lectures, each course extending over a period of not less than twenty-two (22) weeks, the student to be in attendance upon not less than six (6) lectures in each week, and not less than one hundred and fifty (150) lectures in each session. That these lectures embrace those upon Pharmacy, Chemistry, and Materia Medica, but do not include lectures upon Microscopy, Botany, Latin, and other useful branches. That not less than one hundred and fifty (150) hours of practical work, and more if practicable, should be required of each student, to be apportioned throughout the various courses, as may seem best.

(3) That every student, in order to graduate, should be familiar with all the teachings of the Pharmacopœia, and fully capable of performing all operations mentioned in it.

(4) That the course of study shall not be forced, but shall be such as to allow for the proper digestion and assimilation of the instruction given in the school.

(5) That, as far as practicable, students shall give their whole time to college work during the sessions of the school, and not divide their time between work in a store and work at college. That no student shall be retained at school whose outside duties will not permit him to do full justice to his studies or to the laboratory work assigned him.

(6) That the degree shall not be conferred upon any person who is less than twenty (20) years of age at the time of completing his final course at school.

(7) That the degree shall not be conferred upon any person who has had less than three (3) years' practical experience in a good drug store, where physicians' prescriptions are compounded, exclusive of the time spent at college.

SECOND RESOLUTION.

Resolved, That a Committee be appointed consisting of one representative from each of the colleges and schools of pharmacy of this country, with three members of the Association, neither of whom are teachers in any pharmaceutical college or school. The duty of said Committee shall be to take into careful consideration the condition of pharmaceutical education in this country, make recommendations relative thereto, and report to the Association at its next annual meeting.

S. A. D. Sheppard,
William Simon,
Chas. M. Ford.
Committee.

Mr. Sheppard (Having first asked permission to discuss the report): I shall not delay the proceedings for any length of time, as I want to give way to Prof. Simon. I will say that the Committee, every one of them, agreed that they never had a more troublesome question to consider in their lives. Why, it seemed to us to grow from day to day through the year. We commenced to consider it the first of the year, and went on to the close, and worked on it continuously through the whole twelve months; and we believe, gentlemen that this report that we have presented to you points the way. We do not expect that you will adopt these resolutions in detail, every one, but we do feel that this question should be considered from this broad standpoint—what shall be the position of this Association towards pharmaceutical education, towards the great cause of teaching in the schools, and in what way can we best help the great cause of pharmaceutical education? Any one who will take time to consider it, will see that this work is going through a great process of evolution, like hundreds of other classes of work of this kind; that it must be constantly changing, that there are in this great country of ours such varied interests and such different lines of work that there must be of necessity various methods of instruction among this class of technical education. We feel that it is impossible to unify all pharmaceutical training, that there must be a school which will teach one branch, and other schools which will lean towards another, and that there is a class of schools in this country, and will be for many years, that will confer the title known as Graduate in Pharmacy, which title by general consent is supposed to signify that the man holding it is competent to manage a drug store. The title of Pharmaceutical Chemist and other titles that might be conferred would not necessarily mean that. Now, your committee hold that this Association, made up of retail apothecaries very largely, is in position to offer good advice to that class of schools, but that we are not in a position to go any further. Many of us at first reading the resolution as it was offered last year would say, "Those are exactly my sentiments." I was one of those who thought so. I listened to the reading of the resolution last year, and I immediately said, "I am with it;" "That is exactly what I believe in." But when I came to consider closely and carefully the other idea, the conviction has become firmer, and I believe that this Association cannot in any way, by any possible twisting of its rights or duties, pass such a resolution as that. We are simply in the position of a good friend to the cause of education—that is a *prima facie* case; by its very existence this Association is established as a friend of education, and the Committee took the position that this is the only place in the United States where such disinterested advice can be given to the schools; and that the schools may feel that the advice is actually worth something, your committee took the position that this Association has no right to give such advice, unless that advice be of a quality which will be endorsed by at least two-thirds or three-fourths of all those present. It is not a question of the rule of the majority; it is removed entirely from that domain; it is a question of having a thing so good come into this Association that we believe we ought to tell the schools about it, and we have no right to say to the schools "This is a good thing," unless two-thirds or three-fourths of all the members present and voting at this session are willing to endorse it. Therefore, your committee have put in the higher fraction, three-fourths. Now, a word with regard to its details. You will notice this committee is only three in number. Gentlemen, it took this committee nine months to agree upon this compromise. We do not, any of us, believe in each one of these details, but we felt it was an absolute necessity for the good of this work that these three men should come together, because if these three men could not come together, how was it possible to expect that this larger number of men would come together? We do not want to bring in individual reports, so we have had a correspondence all over the country, and I have a pile of letters some ten inches thick in regard to this subject alone. It looks a little thin, but I tell you, gentlemen, it is striking right at the very root of the subject of education; and I thank Prof. Hallberg for bringing the matter to the attention of this Association in this resolution, although I did not appreciate it at that time. I believe the opportunity has come when the Association can take a position towards the cause of pharmaceutical education in this country which will be of lasting benefit. I believe now is the opportunity, and I hope when we come to discuss the question we will leave out all manner of small details. Let us not touch any particular school, any individual, leave out everything of that nature, and confine ourselves to the great question, what position shall this Association take towards the cause of pharmaceutical education, and especially towards the schools which give a degree that says a man is competent to conduct a drug store? I will give way now to my friend Dr. Simon.

DR. SIMON: Mr. Sheppard has presented my views so completely that I have but little to add to his remarks. The only point which I desire to emphasize is to give at least one of the principal reasons why we labored under such great difficulty in trying to determine upon a curriculum. The medical schools, as well as the dental schools of this country, have lately adopted a uniform plan to be followed by all teaching institutions. Why cannot the pharmacists do the same? The main and the principal reason is that our students in many institutions divide the time between college and work and study at the store, and we all know that the relative portions of time devoted to either often vary very much in the different colleges, and more especially with individual students. For my part, I have placed myself upon record repeatedly, and I would do it again to-day, that I think the time is coming, and I hope it will soon come, when our colleges will compel students to devote their whole unlimited time to college work during the session. I do not care how long or how short you desire to make it, but during that time let him devote his whole time to study, so that his mind, his intellect and his interest are in his college work, and not with the interests of the men for whom he works. It is unjust to expect the man to give his full attention to study and his full energy to store duties at the same time; naturally every man is so constituted that he has a preference either in one or the other direction, and in some cases a student may not do his duty fully in the store and neglect his store duties, or, *vice versa*, he will neglect the others. This is the very reason why your committee had so much trouble and difficulty in bringing this report before you.

MR. FORD: Following the other two members of the Committee, one is at the disadvantage of having very little to say; but there is one point I wanted to emphasize, which I think has already been touched upon, and that is, the members of the Committee independently of each other simultaneously agreed that this Association had no official right, as we designated it, to interfere with or to dictate college regulations. It is purely a matter of courtesy if they would consider our thoughts at all with regard to their interest; but it is of such a substantial character, and coming from those who patronize schools, and who influence others who patronize them, that of course it will carry a good deal of weight, and it led the committee to think they might say some strong things for them to agree upon; but as time went on, instead of coming nearer together, we drifted farther apart. I think in the beginning we were very close together in the thought that the resolution was the right thing, but on examining it closely we found it quite vague. For instance where it says twenty-one years, that may mean anything—a man may be twenty-one years of age at the time he graduates, or it may be ten years afterwards when he gets his diploma—and a man may be twenty years when he completes his final course, but the giving of the certificate will not take place until the time of the final examination several years afterwards, when some experience has been had. Another very important part of the resolution is that it requires an experience in store work of four years, and everybody knows that cannot be defined, because experience in a pharmacy is very difficult to determine—some would learn more in one store than others might in another—some might be in the front part of the store and never dispense a prescription, but would be simply drawing soda water and selling cigars, and we know that the authorities are imposed upon in this matter of experience. The Committee realizes also that the time of instruction is an indefinite thing; one man might go to school for six months and not learn as much as some other persons would learn in four months—it depends upon the instruction given and the manner of giving it. That, of course, is a detail which this Association by resolution cannot control. A college might have a forty-weeks course and not give any more instruction than in a shorter time, but that does not interfere with the principles involved, and we should discourage any tendency on the part of the schools of of pharmacy to shorten the hours of instruction, even though they do force the candidate to accept the same kind of instruction in a shorter time. That point is of importance inasmuch as the matter of experience is an indefinite factor; if students have had no experience at all, that is such as we are willing to consider real genuine experience in a pharmacy, it is all the more important that they should spend a longer time at school.

MR. HALLBERG: Mr. Chairman, I think we have had a thorough explanation from each member of the Committee on this question, and it seems to me rather peculiar that each member of the Committee had to stand up and defend this report as extensively as they have done. Now one member of the Committee finds fault with the original resolution, because of its indefiniteness, and another member, the Chairman of the Committee, finds fault with the resolution, and with this entire question, because the Association, he says, ought not to go into details—just formulate some general principles to start with; while the last member of the Committee desires everything in the way of the amount of instruction and all that sort of thing set forth at length. The principle objection is that of Dr. Simon, and I believe that that more largely influenced the Committee than anything else, namely that the shorter the time that the instruction is given in, and the more closely the attention of the student is confined to his college work, the better will be the result. Now that is the proposition we meet every year in this Section, and that I shall not discuss. The Chairman's address, however, gives considerable light upon this subject, and while I am just as willing as any member of this Section to stay here and discuss the subject in all its features, I believe that the best that we can do at the present time will be to adopt the second resolution; and I therefore, Mr. Chairman, move you that the second resolution be adopted, but I would like to offer an amendment to this resolution. In the first place it seems to me that this Association can hardly appoint a committee to consist of members to be appointed by other parties; all that we can do as an Association is to invite those parties to select their representatives to become members of this body, and that is not proposed in this resolution. But I notice another omission—the State Boards of Pharmacy of the country are charged by law with matters directly relating to pharmaceutical education, and the ascertainment of the competency of candidates who come before them and who desire licenses to practice pharmacy—and it does seem to me that it would be an oversight not to invite State Boards to be represented on this commission, and I therefore move you, sir, that this resolution be amended so as to read that this Association invites Colleges and Schools of Pharmacy and the State Boards of Pharmacy each to select one representative to be a member of the proposed committee, together with the members appointed by this Association; and if that amendment is adopted, I should very heartily vote for this resolution.

The amendment was seconded by several members.

MR. SHEPPARD: I would like to speak to the question of the amendment as proposed. This committee will be exceedingly unwieldy even as now made up, and if we make the committee larger I am a little afraid they will do no work at all; I say that in answer to the second part of Mr. Hallberg's amendment. To answer the first part, which I think would also be objectionable, I would say the reading of this resolution is very elastic. Now, can we not authorize the chairman to appoint this committee, leaving him at full liberty to correspond with those institutions and to get the best men suggested by them, or if they do not answer his correspondence, he is at full liberty to appoint any man from that school he chooses? I do not think there would be the slightest difficulty in the chairman appointing the members of the committee.

MR. EBERT: I move, as a substitute, the following:

Resolved, That a committee of three or five members of this Association be appointed, none of whom shall be either teachers or members of Boards of Pharmacy, who shall take into careful consideration the conditions of pharmaceutical education in this country, make recommendations relative thereto, and report to the Association at the next annual meeting.

I wish to modify what I said—that is not right—I wish to say that a committee of three or five, not to exclude teachers, be appointed—that is my substitute—who shall take this matter into consideration.

This motion was seconded.

MR. HALLBERG: The objection to taking up this question in this Association has always been made by every speaker that the Association has no judicial status on this question. Now if we can get a representative from every college on this question, and those representatives come to this Association and suggest or make recommendations, then the action of this Association certainly ought to have considerable effect. If we have a committee of five, then it will only have the same effect as the committee of three we had last year.

Mr. Ebert: I would like to answer Mr. Hallberg's objection if he will allow me. We have tried to call upon every College of Pharmacy and every State Board of Pharmacy, and we can do that if necessary to confer with them; that is, the American Pharmaceutical Association can appoint a representative or ask that a representative be appointed on this committee, and the committee should ask such representative to confer with them.

Mr. Hallberg: That is perhaps what Mr. Ebert might desire. I think it could be done.

Mr. Good: I do not wish to make any remarks now, Mr. Chairman, but I want to say that we should put ourselves in proper shape on this resolution, and I am asking this privilege for the purpose of saving time at a later stage. The point before us is the appointment of a committee. We cannot appoint a committee to consist of persons who are not members of our own body; therefore, I propose to answer this clause in a resolution.

The Chairman: The substitute that we are adopting now is offered by Mr. Ebert.

Mr. Ebert: Any suggestion I will accept.

Mr. Good: It has nothing to do with this substitute.

Mr. Sheppard: I would like to present a resolution.

Mr. Good: Mine is out of the question for the present.

Mr. Hallberg: Mr. Ebert would like a suggestion from any member of this body. (Laughter.)

The Chairman: I think that we have heard all the members who wish to speak on this question. Prof. Sayre has the floor.

Mr. Sayre: Mr. Chairman, when I read the report of the Committee I said to myself, "We will have a nice time over this," and I see my expectations are being realized. I want to say one or two words in regard to the report itself.

The Chairman: Prof. Sayre is out of order; Mr. Ebert's substitute is in order.

Mr. Sayre: Then if I am ruled out on that point I want to make a substitute for all the motions.

The Chairman: Do you offer a substitute for the substitute?

Mr. Sayre: I move that the consideration of this subject be postponed until after the reading of the papers referring to the subject, because these papers bear upon it, and they are written for the purpose of influencing and helping us to make up our minds as to what is best to do; and furthermore, until after we have heard the report of the committee who have been appointed to report upon the Chairman's address, which had something to do with such a resolution.

The Chairman: This motion has been seconded.

Mr. Thompson: In order to put that into parliamentary shape, I move to postpone this subject.

MR. EBERT: It would be better to lay it on the table.

THE CHAIRMAN: I think it is better to lay the subject on the table,

MR. THOMPSON: I move to postpone the consideration of the whole matter.

MR. REMINGTON: I am not going to debate this question. I only want to give some information to the members here. I have been all over the papers, and Prof. Sayre's motion is certainly a good one, and there will be a great deal of light thrown on this subject by the reading of the papers. There is one point about it, and that is, we can hear the report on the Chairman's address, and there are some points at least in consideration that have to come up before the Association, and the Association will have to pass upon the recommendations of the Chairman, and they cannot be considered in this debate.

THE CHAIRMAN: I was anxious to have this very action taken from the first, for I foresaw the deluge.

MR. SAYRE: I mentioned that simply to remind the Association that the Chairman's address contains recommendations, and that we should hear the papers read, and also hear the report, before we pass upon this question.

The question being on the motion to lay the whole matter on the table until the papers bearing upon the subject had been read, it was agreed to.

THE CHAIRMAN: There is a paper that has a bearing upon the subject, and the writer, has requested the privilege of having his paper presented first. It is a short one, but it bears directly on the snbject. It it a paper by Prof. Rusby, of New York; I do not want to take action on that request, but will lay it before the Association, and if the Association chooses, Prof. Rusby's paper will be read first.

PROF. BEAL: I rise to a question of privilege, and ask permission to make a statement as I am aware I shall not have the opportunity of correcting the statement that was made in this Section and which occurs in the Proceedings for 1893, on page 275. I would like permission to read the statement referred to and then make a correction. It reads as follows: "Of these, Chio, Ohio National, Normal, Scio, and Northern Indiana may be regarded as purely business ventures, running in connection with some private teaching institutions." The statements I object to are first, that Scio is purely a business venture, second, that it is connected with a private institution. The institution with which it is connected is a regularly incorporated institution, and has been for thirty years or more, and belongs to, and is under the supervision of the Methodist Episcopal Church of America. It occupies the same relation to that organization which the University of Denver, Northwestern of Illinois, and several others occupy, and is in no sense a private teaching institution, nor is a department connected therewith a business enterprise, since the revenue received from that department at present does nowhere near cover the expense. I do not wish to make this a personal matter whatever, and I have no doubt that when the paper was written and presented to this institution, the writer thought he was correct; but what I intended to say is, that the report should not misrepresent our school nor any other school. If this had been an expression of opinion merely, we would not have called upon this Association to correct it; but it purports to be a statement of facts, and the statement is most decidedly incorrect, and inasmuch as this is a prominent publication, and goes into all the great libraries of the world, we ask that this statement be corrected as publicly as it was made. I think it would be simple justice, and there are those here, many of them, acquainted with the fact and our school, who can support what I have said.

MR. REMINGTON: Mr. Chairman, I move you, sir, that the statement of Prof. Beal be placed upon the records of this Association.

MR. HALLBERG: I desire to say that there is a typographical error in the first place in this article; it was corrected in the manuscript, but was not corrected in the publication. This reads, "Ohio, Ohio National, Normal, Scio, and Northern Indiana:" now the word "Ohio" could mean scarcely anything but the "Ohio State University," which is not included in the table, and has never been in that class. The error was in printing the paper where "Ohio" should belong to "Normal," making it read "Ohio National," "Ohio Normal," and "Scio," making three institutions in Ohio. Now, I desire to say that I regret very much that we should have included "Scio" in that class, and characterized it as a purely business venture. We had, until the last year or two, very little information about the colleges in the state of Ohio, except those in Cincinnati, Columbus and Cleveland. Now, as you are well aware, there are four more institutions in Ohio, making seven colleges and schools of pharmacy in the State of Ohio. It is very difficult to get any information from them, and I have but little information from Scio. Its course of four terms of ten weeks is the same kind of a course as these business college departments have, and, therefore, I classed it in that category naturally. As for private institutions, it is sometimes difficult to draw the line between private institutions and others; but I am very sorry that I committed the error, and I shall take great care to correct it in the future, and if we appoint a committee on that question to report at the next meeting, that committee will have to make a report on just such questions of this kind as to colleges, and there will be an opportunity to set this question right, and also the other colleges in Ohio.

MR. BEAL: I would like permission to make another statement. The remark made by Prof. Hallberg is not exactly correct; our school does not give a course of four terms of ten weeks—our regular college year is nine months. There are three courses, and we require what we call a supplemental term of six weeks, but the diplomas are withheld until the following June, so it takes pretty nearly the entire three years, from the time a man enters the school, before he can graduate.

The question now being on allowing Prof. Rusby's paper to be read first, it was agreed to. The paper was then read, and on motion accepted, and referred to the Committee on Publication.

A BRIEF STATEMENT INTENDED TO ANSWER MOST OF THE QUESTIONS PROPOSED BY THE SECTION ON EDUCATION.

BY H. H. RUSBY.

I have taken the somewhat unusual course of requesting the President to accord the first place in the order of time to my paper, because it seems to bear naturally upon many of the questions proposed, and to take note of the only sound basis upon which they can be discussed. I should propose the following statement:

Since the United States Pharmacopœia is the official and authoritative guide to the practice of pharmacy, no degree implying a fitness for such practice should be conferred until the student shall have become fitted to understand and employ that work. In other words a thorough mastery by the undergraduate of the principles and processes embodied in the United States Pharmacopœia should be regarded as the primary essential of a pharmaceutical education.

No proving or supporting of this proposition is here entered into, because it appears that no exception will be taken to it by any one. I shall, therefore, merely point out its authority in determining the answers to several of the queries proposed. It answers perfectly questions 3, 4, 10, 11, 14, 15, 16, 17 and 18, and aids in the solution of several others.

Question 3. "Can a minimum standard of time of attendance and quality of pharmaceutical education be adopted by American colleges?" The minimum standard of quality should be the rule proposed above. The minimum standard of time must vary according to the facilities afforded by the location and equipment of the several colleges and the system, methods and quality of the instruction given. Those who are deprived of the disadvantages of drug store training in connection with their college course will of necessity require from two to three times as long to acquire the same degree of ability to conduct a pharmacy as those who do not suffer from this deprivation. Uniformity in time among the different colleges cannot in my opinion be attained with propriety.

Question 4. "How can we get the pharmacy laws of the various states more uniform in their requirements?" The pharmacy laws of the several states should be uniform in making conformity to the above standard the test of fitness of candidates for a license.

Question 10. "Should graduates in pharmacy be compelled to pass the examinations of Boards of Pharmacy before being registered?" It is indisputable that some schools of pharmacy are not honest in their application of the above standard, even though professing to apply it. Therefore, Boards of Pharmacy should thoroughly and impartially smoke out the graduates of such schools.

Question 11. "What principles should guide Boards of Pharmacy in framing their examination questions?" This question calls for the same answer as Question No. 10.

Question 14. "Should any candidate be permitted to graduate in pharmacy before he is able to apply the tests and assays of the United States Pharmacopœia?" Question 15. "What should be the minimum limit of knowledge of microscopy before being permitted to graduate?" Question 16. The same applied to Botany. Question 17. The same applied to Materia Medica, and Question 18. "Should candidates for graduates in pharmacy be able to make all preparations, a process for which is given in the United States Pharmacopœia?" are obviously directly answered by my opening proposition.

Questions 19 and 12 are only partly answered by this standard. No. 19 asks: "Where, in pharmacy teaching, are the limits between practical and impractical knowledge, and what constitutes a practical examination?"

Any instruction which properly finds a place in a school of pharmacy does not admit of a division into the practical and impractical, except as to a merely formal and technical division. A knowledge of the fundamental theories essential before taking up practice is in its spirit quite as practical as the subsequent application of those theories. To limit the adjective "practical" to the subsequent instruction in which the student is set to applying this knowledge is perhaps necessary, but it is liable to mislead as to the real nature of such fundamental instruction.

Question 12. "How can dull and lazy students, in colleges of pharmacy, be kept as near as possible abreast of the work done by the intelligent and diligent?" The progress of the student in acquiring command of the United States Pharmacopœia methods should be tested at frequent intervals. As soon as found deficient, he should be returned to the preceding form, and made to work and to pay for the same over again. This process should be repeated until he comes up to the mark, or grows weary and betakes himself to some neighboring "diploma mill."

Question No. 2. "Should such students give their whole time during years to study, or divide it between attending college and working in a store." This question cannot be decided upon any general principle. Each college should be left entirely free to render an individual decision. If a college which is favorably located and circumstanced has found by long experience that the incorporation into its course of drug store training has resulted in producing clerks who are preferred by employers and druggists, a larger percentage of whom make business successes, they should not be coerced into abandoning this system because other colleges are less favorably circumstanced or have been misled into taking a different view.

This discussion would not be complete without reference to other instruction than that demanded as a minimum by my opening proposition. It is to be remembered that our Pharmacopœia is not perfect or complete. It does not aim to embody at once requirements which are impractical for a majority of pharmacists in the present state of the profession. But it aims to add such requirements gradually, and it looks to pharmaceutical education to prepare the way for such addition. It is therefore at least highly important that pharmacy schools should to a moderate extent exceed the absolute requirements of the current edition of the Pharmacopœia, supplementing with instruction suitable to such advances in the work as are likely, or desirable, to be made at the next succeeding revision.

The business of a pharmacist being what it is, and the virtual object of the student in attending the pharmacy school being to fit himself for safely and successfully conducting that business, it follows that there is much extra-pharmacopœial work to be done in instructing him, or at least in determining that he has been otherwise instructed, before conferring his degree; as to how much, ideas are likely to continue to differ widely, accord- to the field of vision of the respective observer.

In conclusion I would emphasize the fact that in the opinion of your speaker, the instruction above demanded is only such as relates to work leading to the degree of graduate in pharmacy. Care has been taken to avoid trenching on the subject of post-graduate instruction and post-graduate degrees.

Prof. Oldberg then read the following paper:

CAN A MINIMUM STANDARD OF PHARMACEUTICAL EDUCATION BE ADOPTED?

BY OSCAR OLDBERG.

More or less definite compulsory courses of pharmaceutical education are established in most of the civilized countries of the world. England and the United States are the notable exceptions. The chief reason why pharmaceutical education has not been made compulsory through the enactment of direct special laws in England and America is evidently to be found in the fact that in these two countries there is unlimited competition in the retail drug business, while in the other countries the competition is limited. Nevertheless, England and America have sought to accomplish at least *something* in the same direction by indirect means. Instead of declaring that every person who is granted a license to practice pharmacy must first have completed a certain course of studies in a pharmaceutical school, the pharmacy laws of England and America simply require that the applicant for such license shall pass an examination conducted by the official pharmaceutical examiners representing the State.

But compulsory pharmaceutical college training has recently been established even in Ontario and Quebec, Canada, and in Victoria and Queensland, Australia, in which countries the retail drug business is carried on in the same way as in America. Therefore it ought to be practicable to adopt compulsory standards of pharmaceutical college training in this country, too. This can, of course, be done only by legislation. That such legislation will surely be undertaken, sooner or later, we may know from the steady progress of pharmaceutical legislation in all lands. We can hope for *wise* laws if the whole subject in all its bearings be carefully considered by competent, conservative, broad-minded men, uninfluenced by personal prejudices, and a definite plan agreed upon by them to serve as a basis for these laws. I, for one, feel hopeful that this can be accomplished.

Before any laws shall be enacted to establish compulsory pharmaceutical education, it would seem to be highly desirable that a body of thoroughly representative men should give this question their most deliberate and earnest consideration, and formulate an authoritative declaration as to what should constitute a minimum course of pharmaceutical education; or, if these men should conclude that more than one class of pharmacists ought to be recognized, each with its own standard of minimum requirements as to education, then these respective standards should be formulated.

This body might consist of delegates or members elected or appointed by the American Pharmaceutical Association, the Boards of Pharmacy of the respective States, and the several pharmaceutical schools or colleges. Amply sufficient time should be taken to give due attention and thought to the question. If one year is not found sufficient, let two years be devoted to it by the commission.

It should be the duty of that body not to attempt simply to equalize or harmonize the different standards or courses now given in existing pharmaceutical schools and colleges, nor to effect any compromises between them. A body or commission constituted in any such manner as here suggested could have no power to compel any college or school to adopt its conclusions, any more than this Association could establish uniformity in the methods and educational standards of the several colleges. On the contrary, the commission, should one be constituted, must, in order that its conclusions may command respect, avoid being unduly influenced by the methods or standards of any of the existing schools. It should, instead, think out and formulate, *ab initio*, such a plan and such standards as may seem to a majority of its members to be wise and practicable, and to best subserve the interests of the people, the medical profession, and true pharmacy, wholly regardless of the present or prospective practices, plans or interests of any teaching pharmaceutical institution or institutions, and without any thought of trying to coerce any such institution into any degree of conformity to the conclusions which the commission may reach.

The conclusions formulated by the commission may not closely resemble the requirements or practice of any one of the existing pharmaceutical schools. Indeed, the differences between different institutions are so considerable that the independent views of the commission would probably not conform to those of any one of them. But if the conclusions of such a commission bear evidence of intelligent fidelity to the true interests and dignity of pharmacy, if they have the stamp of wisdom, justice and independent thought, and if they be practical, their moral weight will accomplish more for the recognition, spread and further advancement of sound pharmaceutical education than any compromise or rivalry between the colleges, or any vote or resolution passed by any association.

No standard of pharmaceutical education can be of any value unless sufficiently well defined to insure a reasonably close approach to uniformity of interpretation. Nevertheless, any unnecessary details should be avoided in its formulation.

Upon the invitation of the officers of this Section of the Association, I submit herewith some facts and questions which seem to me to require very careful consideration in this connection :

1. What should be the minimum of preliminary education required of

all who shall enter upon their apprenticeship in pharmacy, or who shall be admitted to a college or school of pharmacy?

2. Should there be but one class of college-trained pharmacists, and if so what should be the minimum of special education required? If more than one class of college-educated pharmacists be deemed necessary, what should be the minimum course of special education of each class?

3. Should not the minimum standards recommended be such as can be made compulsory by law in the near future?

4. What courses of study ought to be included in the obligatory curriculum, and how wide should be the field of study in each distinct subject?

The answer to this question must, of course, depend upon: (*a*) the number of months devoted to the entire course of education; (*b*) the number of hours' instruction and text-book study from day to day; (*c*) the preparatory education demanded of students; (*d*) whether the course is intended to be eventually made obligatory upon every pharmacist, or only upon those who voluntarily attend colleges of pharmacy; (*e*) whether the students devote their whole time to their school work or divide time between the college and the shop; and (*f*) what is practicable in view of the actual condition of the practice of pharmacy and those engaged in it.

5. How many months or weeks should be devoted to the entire course of special college education?

The answer to this question must necessarily be governed by the very important circumstance whether or not the student gives his whole time and attention to his studies and is well occupied; and if the student's time is divided between his studies and every-day shop employment, then the question must be: What proportion of his time is really devoted to his school work?

A "three years' course" with but five months' work each year would be a very different thing from a "three years' course" with nine months' work each year; six months work, with the student's entire time and attention devoted to his studies, is a very different thing from six months divided between study and wage-earning; ten hours' instruction weekly for a month is not to be compared to thirty hours' instruction weekly of the same kind during the same length of time; and a course consisting of lectures only is entirely different from a course including also laboratory practice.

It is, therefore, self-evident that the value of a course of education is not to be measured by the number of calendar months through which it extends; but that many other and much more important conditions must be considered in connection with it.

6. Should not the students be required to devote their whole time and attention to their studies, to the exclusion of drug-store employment or any other outside occupation during the entire college course? If not, how much longer should the college course be continued in order to offset the time lost by simultaneous wage-working?

7. What should be the minimum amount of obligatory school attendance weekly during the whole course?

In the pharmaceutical schools or colleges the actual practice varies considerably; the instruction occupies 6, 10, 12, 15, 19, 30 and 40 hours weekly.

8. What should be the minimum amount of obligatory laboratory practice in chemistry, pharmacy and pharmacognosy, respectively?

In actual practice the total obligatory laboratory work varies in different colleges from zero to over twenty hours weekly.

Can any valuable laboratory course in chemistry be accomplished in less than 200 actual working hours? And would it be too much to expect 300 hours' actual laboratory practice in chemistry, and the same number of hours in pharmacy as the minimum?

And, finally, if a "standard" is adopted, should it be the most complete and thorough course of pharmaceutical education practicable, without regard to time and expense, or should it be the best course the average pharmacist might be able and willing to accomplish?

The pharmacy laws of Ontario, Quebec, Victoria and Queensland are, perhaps, not explicit enough, but the colleges of pharmacy in those provinces have courses occupying six or more months. The School of Pharmacy of the Pharmaceutical Society of Great Britain at London gives a course of ten months, with the student's whole time devoted to his school work. Can a longer course be adopted as a minimum in America? If so, let us adopt a longer one.

In actual practice the American pharmaceutical schools or colleges give courses ranging from forty weeks to four years, if we are to compare them by the calendar time occupied. We have courses of 40, 42, 44, 46, 50, 52, 60, 76, 114 and 152 weeks, respectively. At least seven pharmaceutical schools now offer courses occupying two years with nine months' full work in each year.

It is highly gratifying that ambitious and eager students of pharmacy in our country can now take solid thorough courses extending over two, or even three or four years of full work. But while these schools are of great value and importance, and must exert considerable influence upon the further improvement and spread of pharmaceutical education, it is certainly equally true that those colleges of pharmacy which are striving to give as extended a course as a *considerable number* of students can be induced to take under existing conditions, are entitled to equal respect and support, and are performing an even more important use. Who shall answer which is the more important, the school for the thousands, the school for the hundreds, or the school for the tens?

Although there are at least 130,000 persons employed in the retail drug business in our country, and more than one-half of those are compounding medicines on physicians' prescriptions, probably only about 10,000 of them are graduates in pharmacy; less than 3,700 annually attend any pharmaceutical school; less than 900 annually finish their college courses; less than 300 annually attend colleges in which the minimum of time required for the completion of the course is at least two terms of nine months each; and less than 100 of these have gotten beyond their first nine months' work. Nearly three-fourths of all the pharmaceutical students in the United States drop out after the "Junior course;" in other words, they devote only from twenty to thirty weeks of their lifetime to the special studies intended to prepare them for their life pursuit. Nearly nine-tenths of the persons who become registered pharmacists and assistant pharmacists never attend any college of pharmacy.

We may well ask, then, how shall a greater number of the persons employed in pharmaceutical work in our country be induced to attend the colleges of pharmacy, and how shall all who hereafter seek registration and license to conduct drug stores in which all kinds of technical pharmaceutical work is done, be induced to acquire the special education requisite for that work? For the accomplishment of these ends I do not believe that any substantial progress can be made by attempting to establish but one standard course of pharmaceutical education, or by a rivalry among the schools to give the longest course. If the apparent tendency continues we shall have, perhaps, courses of pharmaceutical education extending over five or six years before long. What we should try to do, it seems to me, is to gradually elevate the whole body of pharmaceutical workers to a somewhat higher plane, educationally, than they now occupy, and a portion of them still higher than the rest. In other words, let the question of three and four years' courses take care of itself. Let us go down a little nearer to the level of the average education of the pharmacists of the day, and bring them up to as high a standard of special education as seems practicable, and let us be careful not to attempt to do at once that which it will certainly require many more years to accomplish. Let us not make the grave mistake of adopting a *minimum* standard of special college training in pharmacy so high as to be beyond the reach of the majority of the rising generation of clerks and apprentices. Instead, let there be *two* standards.

It seems to me that each college of pharmacy might give two different degrees—one representing, perhaps, one full year's work, substantially as in the School of Pharmacy of the Pharmaceutical Society of Great Britain, and another representing an additional year's full work.

It is useless to ignore the fact that a large majority of all students are greatly influenced by their ambition to secure a degree and a diploma as evidence of their work. Is there any valid objection to the adoption and general recognition of two different courses and degrees—one intended for the great majority of students and to be eventually made the obligatory minimum course for assistant pharmacists, and the higher or longer course to be eventually made obligatory for managers of pharmacies of the higher class?

If an able commission should formulate practicable minimum standards, I venture to predict that every school of pharmacy in the country would at once and cheerfully do more than these standards require.

No school need feel called on to give more than one fixed course or degree, be it the lower or the higher of the two; any school would still feel free to make its courses as much higher than the minimum standards as it may deem best; and there would be nothing to hinder any school from adopting a course two or three or ten times as extended as the highest standard recommended by the commission. There would always be plenty of room at the top; what we most need is a limit at the bottom.

The successful issue of such a movement as this would bring with it another result. It would necessarily help to minimize the jealousies and rivalries which exist between the several institutions—"a consummation devoutly to be wished."

THE CHAIRMAN: I desire your attention for a few moments; in the hurry of closing up and getting down to the train, we may forget an important duty which must be attended to, namely, the nomination of the officers of this Section for the coming year.

MR. WHITNEY: It seems to me upon this subject it is always the policy of the State when they issue a commission, or the policy of all organizations when they have a good thing and know it, to retain it as long as possible. We have to-day evidence of the thorough devotion to this Section of its Chairman, and we have had two addresses worthy of being bound with the most costly covers that we can afford, and preserved not only for this generation but to all future generations: therefore I nominate Dr. Eccles as the chairman of this section.

DR. ECCLES: I would like to state in connection with that, that as I have held the position for two years, it would be establishing a bad precedent, and I therefore thank you very much for the compliment. I feel really gratified that you hold that sentiment towards me, and I cannot express the pleasure that it gives me to have the nomination, but I certainly most posivively decline.

MR. EBERT: I hardly think it is fair after carving out so much work, that Dr. Eccles should turn it over to a successor, and I hope he will reconsider his determination.

DR. ECCLES: No: it would be a bad precedent to establish, and I cannot think of it.

MR. WHITNEY: So far as the precedent is concerned, Sir: we have precedents of this kind everywhere. It is establishing an old precedent when you have got a diamond to hold to it, and not to throw it away for an untried stone. We know what the presiding officer of this Section is, and what he can do, and I certainly hope that, precedent or no precedent, he will continue our President. (Applause).

THE CHAIRMAN: Nominations are in order.

DR. SIMON: I nominate Prof. Oldberg.

PROF. OLDBERG: I decline the nomination: I withdraw my name.

A motion was then made that the Secretary deposit the ballot electing the present chairman.

THE CHAIRMAN: That cannot be done: I positively decline. I have served for two years, and I assure you I appreciate your kindness, but I cannot think of it. It is for the good of the Association that it be not done. There are others who can do as well as I can, and at the same time you will not establish a bad precedent.

MR. FENNEL: If your conclusions are positive and final, and if yon really decline to serve another year, I would like to nominate a gentleman connected with the Association for many years, and with Colleges of Pharmacy, a gentleman interested in, and who has devoted a good deal of time to education of the rising generation in this country. I nominate Prof. J. M. Good. of St. Louis.

Prof. Sayre, of Kansas City, was also nominated.

THE CHAIRMAN: Nominations for Secretary are in order.

J. N. Hurty and C. S. N. Hallberg were then nominated.

PROF. GOOD, having been called upon to read his paper, said: I hardly expected that what I wrote in answer to a letter from our Chairman should be dignified into a paper. He wrote me asking me to write a paper if I had time, and otherwise to write him in a friendly way a letter touching upon some points, and I supposed that he would utilize what I said in his address. I was very glad to say briefly some thing in regard to those queries, but, as I said before, I hardly expected my answers would be dignified into a paper; at the same time, if brevity is the soul of wit, and tediousness has its limit, perhaps these will answer.

The following is the text of Prof. Good's paper:

ANSWERS TO QUERIES 1, 2, 3, 4, 5, 8, 9, 13.

BY J. M. GOOD.

QUERY 1. Should students of Pharmacy be required to give evidence of having had experience in a drug store before permitting them to graduate or register, regardless of quantity or quality of knowledge possessed?

Unquestionably students should give evidence of having had experience in a drug store before they should be allowed to graduate or register. Until such time, their knowledge is deficient both in quantity and quality. Their pharmaceutical education is one-sided and incomplete.

QUERY 2. Should such students give their whole time, during College years, to study, or divide it between attending College and working in a store?

Answer to this cannot be definite and conclusive. There are conditions which will point to either one course or the other; they must all be taken into account. For example, a person who has attained his majority, has had four or five years' practical experience in a drug store and who can afford to give his entire time and attention to his college work, makes the most desirable student. The majority of those applying do not belong in this class.

QUERY 3. Can a minimum standard of time of attendance and quality of pharmaceutical education, be adopted by American Colleges?

It would be well if a minimum of time of attendance, etc., were agreed upon by the colleges of pharmacy.

QUERY 4. How can we get the pharmacy laws of the various states more uniform in their requirements?

Anything like uniformity of requirements for pharmacy laws in the several states is not, at present, possible.

QUERY 5. What objections can be urged against bestowing the degree of Doctor in Pharmacy upon Graduates in Pharmacy who take a post-graduate course?

The degree, "Doctor in Pharmacy," might be bestowed upon candidates who had completed an advanced course. An objection which may be mentioned is, improperly abbreviated it is likely to be confounded with Ph. D., "Doctor of Philosophy." There would probably be found those willing that the public should be thus deceived. I should rather err on the side of simplicity in the matter of giving degrees.

QUERY 8. What can the American Pharmaceutical Association do toward improving such parts of the patent and trade mark laws as have a bearing on pharmacy?

The American Pharmaceutical Association might well put itself on record as protesting against the abuse of our patent and trade-mark laws and ask for a modification of them as far as they apply to remedial agents.

QUERY 9. Are registered clerks, by virtue of their registration, officers of the State, and, if so, is not the State instead of the employer responsible, before the law, for their serious mistakes?

Clerks registered by authority of pharmacy laws become legally responsible for their own acts and answerable to the state. The public is likely to hold the employer morally responsible, however, and it will punish him in its own peculiar and effective way.

QUERY 13. How can Colleges of Pharmacy be placed upon a purely educational basis› instead of being conducted for the money they can make?

By *liberal endowment* Colleges of Pharmacy may be placed on a purely *educational* basis. Conscientious officers and teachers will, as they are now conducted, put a restraint upon the commercial spirit.

MR. HALLBERG: Now, Mr. Chairman, a few words in regard to Prof. Good's answer to Query 9. I have always regarded the position of the registered pharmacists in this way; by virtue of the pharmacal laws a registered pharmacist is criminally liable; that is, if he permits a serious blunder and some one is poisoned, then they can proceed against such registered pharmacist criminally; but the proprietor alone can be proceeded against civilly, that is, the proprietor can be sued for damages, but the dispenser only can be prosecuted criminally.

Mr. Ebert: That is correct; that is the point I wanted to make.

Mr. Good: Let me say in answer to Prof. Hallberg, that I desire my answer to the query so modified that it will be better understood, and I accept Prof. Hallberg's answer.

On motion the session then adjourned to meet again at night.

Second Session.—Friday Evening, September 7.

Dr. Eccles, the chairman, opened the session at 9 o'clock, and Prof. Hallberg was asked to assume the duties of Secretary.

Mr. Simpson: I wish to offer a set of resolutions. It is in fact such a set of resolutions as was passed by the International Pharmaceutical Congress, which met in Chicago last year.

The following resolutions were then read:

Resolved, That no person should be admitted as an apprentice in pharmacy unless he shall have given evidence by satisfactorily passing a preliminary examination, or otherwise, that he possesses a general education sufficient for such apprenticeship, and as advanced as the conditions of the practice of pharmacy in the United States permit, and his term of apprenticeship in pharmacy should in no case be counted so far as it may antedate such evidence of sufficient preliminary education.

Resolved, That the period of apprenticeship in pharmacy ought not to be less than four years, including the time devoted by the apprentice to regular attendance upon the courses of instruction in a pharmaceutical school.

Resolved, That this Association approves of the establishment of a compulsory curriculum of pharmaceutical education, and holds that no person should be regarded as a qualified pharmacist who has not pursued to completion a systematic course of instruction in chemistry, pharmacognosy and pharmacy.

Mr. Simpson: As I have said, my resolutions are the same resolutions as those adopted by the International Pharmaceutical Congress, and are simply an expression of the sense of this Association upon a subject treated of, if I remember rightly, by a committee of the International Congress, who prepared these resolutions. Prof. Hallberg was the chairman of the committee, and these resolutions were adopted by the Congress. This Association should put itself on record as in accord with the opinions of the Congress in that direction. It will be observed that the resolutions simply express the sense of the Association that this is a condition of things which ought to be—it is not so worded as to commit the Association, and the desire I think is not that it shall be immediately accomplished, but that it is an end to be looked forward to.

The Chairman: Shall I present all three resolutions together, or singly?

Mr. Oldberg: As they were adopted together by the Congress, I think we can adopt them together.

The resolutions were then read a second time and adopted.

Dr. Bartley: Would it be competent to send a copy of these resolutions to the Secretary of each State Board of Pharmacy, and to inform them as to just what the position of this Association is on the subject?

THE CHAIRMAN: I suppose that would be the proper thing to do. Do you make it as a motion.

DR. BARTLEY: I do.

THE CHAIRMAN: It has been moved and seconded that copies of this resolution be sent to the Secretary of each State Board of Pharmacy—would you not include the Canadian Boards also?

MR. ELIEL: Mr. Chairman, in connection with this motion I would like to ask what is to be done with those states that have no pharmacy laws, and how are they to be officially notified? I would like to add to this motion, that for any state having no pharmacy laws, the certified copy be sent to the Pharmaceutical Association, and that the action of this Association in connection with this matter be imparted to the secretary of such state association.

THE CHAIRMAN: Do you make that as an amendment?

MR. BARTLEY: I will accept that amendment.

MR. FENNEL: To my mind this brings instantly the resolutions offered by the committee of three—a second resolution was offered and no action taken on it, but the matter was postponed in order that it may come up after the reading of our papers; now, we come in with a matter that properly follows this and we take action—as I understand, this is an approval by us of what has been done by a committee, that is original work. Why not bring these resolutions in afterwards?

MR. OLDBERG: These resolutions are extremely general in their character and do not begin to touch or interfere with this question in the least. This report enters into the details; the resolutions which were just read do not enter into any details at all.

MR. FENNEL: That is a matter of opinion; I think that they do.

MR. HALLBERG: If the Chair will allow me, I think the International Congress resolutions refer more particularly to the local requirements, while the question before the committee has reference to graduation requirements.

THE CHAIRMAN: That is as I understand it.

MR. EBERT: Mr. Eliel has suggested that the Secretaries of State Boards of Pharmacy be notified, and in states that have no pharmacy laws, that the secretaries of the pharmaceutical societies be notified; now it will do no harm if these resolutions be sent to the secretary of every state organization, so that they may be taken up at their annual meeting, and in that way the state organization will be apprised of what this Association has done.

THE CHAIRMAN: That suggestion was acepted.

MR. EBERT: Mr. Eliel only referred to states having no pharmacy laws, and I would suggest that the secretaries of all the state associations be also notified.

MR. REMINGTON: I was about to make the same suggestion: if it is done at all, all State Associations ought to be notified at the same time; make it general, and send it to all of them.

The amendment was accepted by Mr. Simpson, and the words "that it is the sense of this Association" were prefixed to the resolutions. The question being on the motion to adopt the resolutions, it was unanimously agreed to.

THE CHAIRMAN: Is there any other business to come before the house before we proceed to the reading of papers.

MR. FENNEL: I would like to hear the report of the committee on the Chairman's address.

THE CHAIRMAN: Is the committee on the Chairman's address ready to report?

MR. SIMPSON: I think the chairman of the committee is not here, and he has the papers.

MR. HALLBERG: I would like to hear the status of the report as to the Proceedings of the International Congress—perhaps Prof. Oldberg will give us some information as to the publication of the report.

MR. OLDBERG: It does not seem to be in order at all, but if the members of the Association present desire some information, I can only say I am at your service, but do not feel authorized to occupy your time.

MR. FENNEL: I believe that will be business to come before the Association at large.

MR. OLDBERG: I will say this, however, Mr. Chairman, that a committee of the Association brought in a report at this meeting which the Association adopted and referred to the Council.

THE CHAIRMAN: Now we will proceed to the papers.

A paper was then read by Mr. Whitney, entitled "Answers to Queries 10, 11 and 21.

ANSWERS TO QUERIES 10, 11 AND 21.

BY H. M. WHITNEY, LAWRENCE, MASS.

My first thought after carefully reading the list of twenty-three queries, was of the criticism made on American Pharmacy by a writer who attended our last meeting in Chicago, and who, it seems to me, could justly have been answered as the following clipping from the "Boston Commonwealth" of May 19th treats other English writers, and I certainly have no desire to offer opinions upon subjects which will, and should properly, be decided by each college and locality, as the conditions and circumstances demand.

"The attitude of the English reviews toward the Coxey movement has been rather entertaining. That amiable old thing, the 'Saturday Review,' bothered her dear fussy head a good deal, because, owing to the general unreliability of American newspapers, she could not feel sure that the army really did capture a train out West. That would have been nice, if she could only have credited it; so American! The 'Spectator,' on the other hand, was sour and serious. It was sure that, by the beginning of May, lots of loafers would be collected in Washington, a menace to the government. It admitted that the government would win the day, and probably without bloodshed. 'But even if no calamity shocks the Union and humanity,' it said, 'what a scene to have occurred in the capital of the richest nation in the world, and the one which most consistently boasts that it has solved the problem of the future!' It is a pity that all the advice the 'Spectator' gave to help Congress get rid of that unruly army—50,000 was the 'Spectator's' estimate of the probable number of the Unclean—should have been useless. May the 'Spectator' not be discouraged merely because it has usually failed to understand conditions over here. May it go right on talking about us. Its comments and the 'Review's' comments on things American, contribute to those things a seasoning of joyousness, that were it not for the criticisms, they might not possess."

Upon Queries 10, 11 and 21 I have opinions or convictions as a result of nine years' service upon a Board of Pharmacy, but my opportunities and environments may have been exceptional, and, in expressing my views, I disclaim any reflection upon those who have had less, larger or more varied experience, and who have as honestly arrived at entirely different conclusions.

Q. 10. Should graduates in pharmacy be compelled to pass the examinations of Boards of Pharmacy before being registered?

Boards of Pharmacy, as I understand it, are not created to examine *professors* or *experts* in chemistry, botany, materia medica, toxicology or posology, but to determine whether or not the applicant for registration is an all-round practical pharmacist, sufficiently posted and familiar with drugs, their preparations and use, to be a help, a sort of beacon light to guard and guide, rather than a dense, ponderous fog to envelop and confuse the people by lofty and unintelligible jargon.

In some of the States the *law* requires examination in every case before registering. I recall one case of a recent graduate in pharmacy who has been before the board four times and failed.

Another, from one of the oldest and best colleges of pharmacy in this country, whose answers were given with assurance and confidence. What is petrolatum? Ans. Crude carbolic acid. Two are official, crude and purified. If petrolatum was ordered, should put up the crude carbolic acid. One drachm of iodine will dissolve in one ounce of water all right. Lugol's solution is solution of iodine and arsenic—correcting himself, said iodine and mercury. Alcohol and water have same number of drops in a fluid drachm. Would give as a large dose of tinct. aconite five drops or ten minims.

Another graduate, but not in the United States, says there are 430 grs. in a troy oz. and 440 in an avoirdupois oz. One oz. of boiling water will dissolve one drachm of iodine. Proto-iodide of mercury is the red iodide. Don't know the deuto. Proto-chloride of mercury is the bi-chloride.

These are, of course, exceptional cases, but are cited to show that all graduates in pharmacy are not of necessity and in fact practical pharmacists.

My answer to query 10 is, They should.

Q. 11. What principles should guide Boards of Pharmacy in framing their examination questions?

The guiding principle should be as nearly as possible absolute *justice*. 1st. To the people whom the Board serve. 2d. To the applicant who is qualified, as well as to the one who is not. 3d. To the employer, who has the right to expect a safe and competent person. 4th. To the Board, whose action, if not just and creditable to itself is a snare and delusion to others.

The important point is: Has the applicant knowledge, skill, experience and capacity to meet the exigencies and emergencies daily and hourly presented, with general information and comprehension of his responsibilities now demanded and expected by the people? Parrot pharmacists may answer for floor walkers, triturate and nostrum peddlers to some physicians and grocers, but are not the compounders and dispensers in a pharmacy, which the general public and honest educated physicians have a right to expect, or an honest Board of Pharmacy indorse.

Q. 21. Should Boards of Pharmacy publish from time to time, in the pharmaceutical press, their past examination questions, as a guide to future candidates of the nature of the subjects upon which they are expected to pass?

If Boards of Pharmacy are to be rated as institutions for learning, and it is desirable to encourage quiz books, and discourage general culture and colleges of pharmacy, aid and assist those whose only aim and purpose is to acquire just enough learning to secure the coveted parchment and ten or fifteen dollars a week from some department store or saloon druggist, then yes. *But* if Boards of Pharmacy are established to protect the people from fraud, ignorance and mere pretenders, and elevate and dignify the calling, then no, a thousand times no!

Soon after mailing my letter of the 22d to you, a letter was received at this office, and I send you a *verbatim* copy to add to my previous letter, if you desire. The writer is no chicken, having been a crower for fifty years, and claims to have had fifteen years' experience as a physician and four and a half years' experience as a pharmacist. He came before this Board for examination March 29th, 1894, with the following result: Oral 0, written 12, drugs 10.

COPY OF LETTER—AN APPEAL FOR THE AFFIRMATIVE SIDE OF Q. 21.

"MAY 22, 1894,
"* * *, MAINE.

"*Dear Sir:* Will you please send me some coppies of former questions in pharmacy? It occurs to me that they may furnish me with an idea as to how examinations are conducted. The study of Remington seems almost endless to me, and I want to acquire the most useful portions and such as the Board would expect me to know.

"I am putting in my time as well as I can in an ordinarily busy drug store, hoping to feel safe enough to present myself sometime in the autumn.

"Yrs. truly, *. *. * * * *."

This is not an unusual request, we receive many of them every year; but coming at *this time*, it seemed so appropriate a conclusion that it is sent for your consideration, approval or rejection.

Prof. Whelpley then read the following paper and said:

This paper is not printed, as I did not until a few days before the meeting, find out just what a Board of Pharmacy examination should be. I would also state for the benefit of the members of Boards of Pharmacy present, that I have never been examined by a Board of Pharmacy, and never expect to be. I am not a member of the Board of Pharmacy, and never was, and do not expect to be. So I consider myself eminently fitted to state to the Boards of Pharmacy what the examination should be, and I think that members of the Boards will recognize that class of dictation.

BOARD OF PHARMACY EXAMINATIONS.

BY H. M. WHELPLEY, PH. G.

Answer to Query 11, which reads, "What principles should guide Boards of Pharmacy in framing their examination questions?"

In the first place permit me to say that I consider board and college examinations to be entirely distinct and separate in their requirements. The college ordeal is given after two or more years of careful training, and is based on the maximum demands on the pharmacist entering the field of activity in his profession.

A Board of Pharmacy examination is a test to determine whether or not the applicant will be able to conduct a drug store with the exercise of due knowledge and skill. The questions should all be selected from the many that are daily arising in the business, and which the competent pharmacist can answer at any time without reference to his books. The practical nature of a Board examination demands that it can be passed at any time by the competent pharmacist without previous "reading up" for the occasion.

It is simply ridiculous to make a candidate's fate depend upon questions that he will never be called upon to answer in the exigencies of the business. I never could understand why some Boards give a large number of questions that cannot be answered without special cramming for the occasion. Perverted in nature is the examination which the candidate can pass to-day but will fail to master after an additional year of drug store experience.

The licentiate in pharmacy should possess at least the minimum amount of knowledge and skill in the profession and trade to insure that he or she is a safe person to intrust with the responsibilities of conducting a drug store.

The amount and nature of the preliminary education possessed by the applicant should have its influence on the Board. It is not only legitimate but a Board's duty to discourage the ignoramus who aspires to become a druggist through the short-cut road of a Board examination.

Laws are for the common good of the people and may work hardshid in individual cases. A Board of Pharmacy should conscientiously discharge its duty, but need not give examinations of a nature that justly renders the body unpopular alike with the pharmacist and the public.

The length of time a pharmacy law has been in force is an element in determining the nature of the examinations. More care should be exerted to shut out the incompetent tyro than in persecuting the druggist who has become a fixture in the business, although he may be of an antique pattern.

A deaf ear must be turned to the apprentice who pleads for a special examination because he expects to run a general store at some cross roads where prescriptions are never seen. The possession of a certificate of registration is very likely to change his mind, and you may hear from him as proprietor of a new drug store in some locality where the crying demand for more pharmacists has long since been satisfied.

No Board of Pharmacy examination can be complete without requiring actual work in the reading and compounding of prescriptions. The candidate should be required to demonstrate his ability in reading ordinary prescriptions, making pills, emulsions, spreading plasters, and doing other dispensing work.

The recognition of drugs, galenicals and chemicals deserves a prominent place in the examinations. No specimen should be given that cannot be recognized by its shape, color, odor or taste.

The verbal questions about the specimens recognized appropriately cover medicinal action, doses, names, trade varieties and properties of a good specimen, adulterations, substitutions, pharmaceutical preparations, etc.

Although not generally recognized, I believe that Boards of Pharmacy should question prospective druggists as to their knowledge of the State pharmacy law, familiarity with the purpose of colleges of pharmacy and their pharmaceutical journal acquaintances.

The above query calls for principles rather than details, so I omit specific examples of examination questions modeled on the plan just outlined.

THE CHAIRMAN: I believe that it is all on that particular question. Another phase of the subject that we have been dealing with is that of the college student dividing his time between the school and the shop, and I think it would be best for the time being, to continue the reading of the papers and have as many as possible of them read. So we will have the next paper by Prof. Oldberg, entitled "An Answer to Query No. 2."

The paper was then read by the author.

AN ANSWER TO QUERY NO. 2.—SHOULD PHARMACEUTICAL COLLEGE STUDENTS DIVIDE TIME BETWEEN THE SCHOOL AND THE SHOP?

BY OSCAR OLDBERG.

During the entire period of his college courses, the student should, if possible, devote his whole time and attention to his studies, to the exclusion of all other occupations—first, because, within certain limits, he can accomplish twice as much in two hours as in one, and, secondly, because his work as a student will be much more effective when his mind is free from all other cares and duties than when certain days and hours belong to his employer and all his studying must be done when he is not on duty at the store.

Pharmaceutical college students who work in drug stores while at college, do so, with rare exceptions, solely for the sake of the wages they are able to earn to help pay their expenses. But any student, who, by reason of limited means, finds it necessary to earn a part of his expenses by rendering any kind of service for wages, must, of course, at the same time, submit to a corresponding loss of time in his school work. He cannot eat his apple and save it too. Necessity may compel him to submit to this loss if he is unable to attend college at all in any other way; but it is a costly method, for it is evident that all of the time he devotes to wage-earning must be made up by proportionately lengthening his college attendance, his attention is diverted from his studies even when he is not on duty at the store, and the colleges of pharmacy bear testimony in their annual announcements that the wages paid to students are small. As a matter of fact the students in attendance at any college of pharmacy can, as a rule, earn no more than the cost of their room and meals, and the wages they earn are, of course, in inverse proportion to the amount of school work they are required to do.

President Eliot of Harvard University stated in a recent address that students attending universities and colleges ought to devote ten hours daily to their studies. This opinion is in accord with the prevailing custom in all educational institutions, pharmaceutical as well as others, which are *not* conducted on the assumption that their students must be given sufficient time unoccupied by studies to enable them to earn their living during the same time which they devote to their education.

Colleges or schools of pharmacy so managed that the students can earn their expenses by employment in drug stores throughout the school sessions exist only in America.

I have heard and seen the opinion expressed that pharmaceutical college students make more thorough progress in their studies when they divide their time between the college and the store. It is claimed that continuous employment in the shop during the entire college course affords valuable aid to the student, because, it is said, he can then from day to day find opportunities to apply or verify what he learns in the lecture room, etc. One teacher has, in a letter to me, expressed such earnest convictions in that direction that I am led to believe that he would prefer a system of pharmaceutical education which actually requires the student to alternate from day to day between the college and the shop. But such a system, in order to be of any value, must provide that the student is *not* employed in the store for the service he can render in exchange for the wages he receives, but that his employer, instead, consents to take him into the store with the express stipulation that the young man shall be given just such work as he requires for purposes of instruction. This is impracticable.

The shop training and practice which an apprentice or clerk gets when he is regularly employed on full time in a good pharmacy, are not only valuable but absolutely necessary to his complete development into an accomplished pharmacist. But such irregular, interrupted employment as college students can get has no educational value whatever. Besides, we are informed by the annual announcements of the colleges of pharmacy that only "a limited number" of students can be provided with (partial) employment in the drug stores during the college sessions. A system which benefits only "a limited number" of the students is surely not to be commended.

But the language used in the annual announcement of colleges of pharmacy which offer to aid their students in their efforts to obtain employment during their college attendance, indicates plainly, in every instance, that the object in view is not instruction but wages, and in no instance do I find a college announcement recommending that the students secure employment for the purpose of rendering their college courses more effective.

Several of the American Schools of Pharmacy are conducted on the principle that the students will devote their time and attention exclusively to their school work and will *not* be employed in stores during the school sessions. These schools provide over thirty hours' instruction weekly, and expect the student to devote at least twenty hours more to text-book study, thus occupying the whole time of the students fully. In other words these schools of pharmacy are conducted in the same manner as are other technical and professional schools of the same grade. Students who are employed in stores cannot, in these schools, keep up with their classmates, and they should not attempt to attend such schools unless they divide the courses of study. In other words, any student who wishes to attend a school of pharmacy in which the undivided studies are so arranged as to occupy fifty hours weekly, and who at the same time wants to devote a part of his time to wage-earning, can do so only by taking about one-half of the regular work in each semester, thus devoting two years to the school work which other students finish in one year.

In colleges of pharmacy giving courses of study adjusted to the plan of allowing the students sufficient spare time from their school work to enable them to earn their expenses, the average amount of obligatory school attendance is less than thirteen hours weekly. Students who desire to devote their whole time to their studies, can, of course, attend these colleges; but, if they have good natural ability, they will be able to accomplish far more than the prescribed curriculum, and in order to occupy their time they will be obliged to take up enough of the optional or extra work usually offered.

The most important difference between the curriculum which is practicable when the student devotes his whole time, and the curriculum possible when he devotes only one-half of his time, is mainly in the laboratory courses. Schools of pharmacy occupying the whole time of their students devote on an average more than twenty hours weekly to laboratory practice, while in the other colleges the average amount of laboratory work is less than six hours weekly.

In view of these facts, I am convinced that the best thing for the student, from both the educational and the economic standpoint, is to do one thing at a time. Let him get his shop training in an effective way by regular and continuous employment in the drug store when he is not attending a pharmaceutical college; and when he takes his college course in pharmacy, it is best for him in every way that he should withdraw from all other occupation until he has finished his task.

MR. REMINGTON: Is there going to be any discussion at all on these papers?

THE CHAIRMAN: We want to get a number of the same kind read.

MR. REMINGTON: It seems to me that we lose a great deal in that way, as we lose the thread; there are some points in that paper that we ought to discuss at the time while the members have the points in their minds, and we are very apt to drop one. Now this is one of the most important papers and ought to be discussed, unless you have decided upon another plan.

THE CHAIRMAN: No, I have not; the only object was to get as many papers read as possible. But this paper can be discussed. I presumed that each one would take the points as they came up and fix them in their own minds, and then discuss them when the papers were all read.

MR. REMINGTON: Are there any other articles on this particular subject?

THE CHAIRMAN: Yes, there are several. We have one paper on the subject by the President of the Board of Pharmacy of Georgia.

The paper was then read by the chairman.

AN ANSWER TO QUERY NO. 11—WHAT PRINCIPLES SHOULD GUIDE BOARDS OF PHARMACY IN FRAMING THEIR EXAMINATION QUESTIONS?

BY S. C. DURBAN, AUGUSTA, GA.

So far as State pharmacy laws are concerned and the Boards which act under them, they primarily seek to establish, through examinations, the competency of parties who engage in the practice of pharmacy. Whatever other provisions these laws contain, we will all agree that this is the most important feature.

The subject of this Query is one of interest to every pharmacist; of enough interest and importance to suggest the widest discussion, that a true and equitable adjustment of what should be the principles upon which questions for examinations should be framed: that exactly even and just conclusions be made.

I am prepared to believe, notwithstanding, State Boards in conducting examinations do so under rules of their own choice and pleasure; that it would be altogether better and more desirable if a mutual understanding between the Boards of different States could be had, whereby the standing of a licentiate, of whatever grade, would be of as much value in one State as another. As I take it, while these laws are made with a view of permitting only those who have been found competent to practice pharmacy in the State where they present themselves for examination, that, as a matter of fact, the intent of these laws is more far reaching, in so much as that they seek, through this method, to establish and maintain in all the States a high standard for, and a uniform knowledge of the practice of pharmacy; the exact efficiency of those engaged in pharmacy, and the final establishment of all we seek and claim; our right to be recognized as a distinctive professional body, second to none by reason of high scientific attainments and usefulness.

Experience covering several years service as a member of the Georgia State Board of Pharmacy and an intimate knowledge of the convictions of others of our Board, convinces me that in no way can the competency of an applicant be better judged, and his fitness to practice pharmacy be better arrived at, than to frame examination questions, first, from the details which involve the actual daily practice of his profession. This class of questions should be very thorough and exacting, and should embody at least 65 per cent. of the examination; the balance, 35 per cent., should embrace the theoretical questions. The highest general average should be required in practical pharmacy, prescriptions and doses.

While this query does not contemplate other important considerations which should govern a Board in its examination of applicants, and the grade of license to be issued, based upon higher education, length of service and competency, I hope, through the efforts of those who are constant and untiring labors in behalf of pharmacy and its elevation, to see inaugurated a plan which shall establish a uniform principle, operative in every state alike, for State Board examinations.

The two following papers were then read by title, the authors not being present:

Should Requirements for a Degree in Pharmacy Include Practical Experience, and if so, Should it Precede or follow College Training.—By S. R. Boyce.

Answers to Some Queries of the Section on Legislation and Education. By F. J. Wulling.

SHOULD REQUIREMENTS FOR A DEGREE IN PHARMACY INCLUDE PRACTICAL EXPERIENCE, AND IF SO, SHOULD IT PRECEDE OR FOLLOW COLLEGE TRAINING?

BY S. R. BOYCE, PH. C.

Pharmacy is popularly defined as the art of preparing and dispensing substances for use as medicine, but as taught in our modern schools, it is emphatically a science, and should be recognized as such. That pharmacy has a scientific as well as a traffic side, must be admitted by all. It is the province of pharmaceutical schools to teach the *science* of pharmacy, and with this their duties cease. It is the province of well-regulated commercial establishments to teach the *art* of pharmacy, which is largely the application of this science to practical purposes. In early times a knowledge of the latter, the commercial side, with occasional delusive freaks and fantastic jugglery, were considered the prime factors in the education of a pharmacist.

But the day of "tutelar gods" and "patron saints" is past; every year adds to our store of scientific knowledge, and casts a ray of light into some dark recess of the past.

Empiricism is the cradle of science, but as the cradle becomes less useful when the child begins to walk, so the superficial art of the past is gradually giving way under the burning truths of science.

Since our calling presents a purely scientific, as well as a practical phase, it is but reasonable to expect that public sentiment will exact of the prospective licentiate in pharmacy a knowledge of both, and to the student, the absorbing question is: How shall I get this knowledge? He decides upon a course of instruction in some teaching institution, secures the announcements of several schools, and proceeds to sum up the requirements for a degree.

To satisfy the entrance requirements of one, he must present a diploma from some reputable high school, or must pass examination in the common branches, with the addition of algebra and one or two of the foreign languages; in another the common school branches only are required, and in still another there is no specific entrance requirement.

He investigates farther, and finds that the curriculum of the several schools, from the beginning to the end of the college course, varies as much as do the requirements for entrance ; some requiring mostly class-room work, some weaving in an abundance of laboratory practice, and still others alternating lectures with sufficient shop practice to afford the student a means of support. The ultimate hours of credit required for the completion of the different courses, vary from three hundred to fifteen hundred. One institution will not confer a degree without evidence, substantial or otherwise, of four years' practical experience, and another requires no experience whatever. The result of all this *babel* of confusion is, that "Graduate in Pharmacy" has come to mean practically nothing, and the work of well-meaning and competent educators is unjustly shorn of its glory. It reminds one of the modern handicap bicycle race, in which the stronger men are held back until the weaker ones have made a safe distance in the lead, and the judges concede position prizes, not to the fastest riders, but to the most skillful jockeys. Shall we ascribe all this to lack of the proper conception of what a modern pharmacist should be, or to lack of co-operation in educational matters, or shall we admit that it is partly due to selfishness on the part of those less scrupulous in their motives?

I have said that the modern pharmacist must be a scientist, and in addition he must possess politic qualifications that come only by actual contact with men and the practical problems of life ; economically, they cannot both come at once, and the question is, which should come first? Shall we give the youth a number of years in apprenticeship prior to school training, or shall we educate him first? In answer I will ask, does education tend to develop the power of correct conception? Is this power God-given, and, therefore, immune from perversion, or is it, like the other faculties of mortal man, capable of being trained and directed by the zealous eye of a master?

As reading, spelling, composition, and arithmetic, constitute the basis of a common school education, so the sciences, chemistry, botany, pharmacognosy, and physics, constitute the basis of a pharmacist's education. These are the source of the principles that in after life constitute his inexhaustible storehouse from which he may draw daily supplies, and the more he draws out the fuller becomes his stock. They are seeds planted in fertile soil where they multiply and bear fruit, as long as there is food to nourish them ; they are pure mobilized capital, always at the command of their possessor, and always subject to the law of increasing returns. Truly, "Science is, like virtue, its own exceeding great reward."

Education, to be effective, must be intensive ; and to be intensive, must be consecutive. Any considerable lapse of time between the period of common school training and that of taking up scientific studies, is just so much of a break in a thread that should be continuous. For the welfare of the student he should have no leisure time for anything except the little exercise and recreation necessary to keep his system in a vigorous condition. For this purpose, one or two hours each day is sufficient, and the time should be spent in the open air, or in some well ventilated room; certainly not inside of any drug store. This last statement is contrary to the views of some, if we may be allowed to judge their sanitary scruples from their advice to young men.

Logically, the time for shop training is after the completion of a college course, and I can conceive but one condition in which any considerable amount of valuable knowledge might be gained previous to this time. I refer to youths who have not yet reached the age when it is practical to push their education on the intensive plan; here leisure hours might be spent in the store with profit. But when once the age of physical maturity is reached, to study the sciences first is certainly economy, both logical and political.

What we want is not more pharmacists, but better ones, and to make better ones we must begin right. A person may learn to execute a piece of music without knowing how to read notes, but if he would become an accomplished musician he begins by learning the elements of music, after which he produces chords, and sometimes discords, but by persistent practice harmony becomes a second nature; just so in everything we undertake, be it pharmacy or what not, there is a right way and a wrong way, and if we would become artists we must lay an adequate foundation by mastering the underlying principles: for these must come, and the sooner we get them, the more time will be ours to use them. The man who enters upon life's duties with his eyes open has a great advantage over him who gropes in darkness.

As the necessity for more science, as a foundation for research in pharmacy, becomes apparent, a longer course and more thorough preparation for it naturally follow. Dr. Prescott, now in Germany, writes that the one thing in which our university schools are deficient, is facilities and time for carrying on original research; and, if this be true of the university schools, it is doubly true of the majority of colleges in the country. For ample proof of this statement I need but refer to the wealth of papers sent to the American Pharmaceutical Association from the university schools each year. J. U. Lloyd, in his "Study in Pharmacy," p. 47, says: "The college and the university are but adjuncts to one part of pharmacy education; they are necessary to the scientific side of the art, but cannot evolve pharmacists." From F. B. Power (Pharm. Era, March 15, 1894), I quote: "The aim of pharmaceutical schools should be to afford a broad and thorough training in the sciences pertaining to pharmacy, or in those branches of natural science, theoretical and applied, upon which the successful practice of pharmacy depends, such as general and pharmaceutical chemistry (including chemical analysis), elementary physics, botany and pharmacognosy. These studies may and should, when possible, be supplemented by such other closely related and useful studies as bacteriology, hygiene, etc. The so-called art of pharmacy in its generally understood application to pharmaceutical manipulations, can only be properly learned in the daily work of a well-regulated and legitimately conducted pharmacy, and I believe it to be a mistake and an evidence of abnormal comditions when the training of this character is relegated exclusively to the schools."

As stated above, the colleges and universities are necessary to the development of the scientific side of pharmacy, but with this their duties end. While they may give the student many a helpful hint and greatly increase his discriminating power, yet they cannot vouch for his ability to cope with the perplexing problems of trade. They cannot teach him just how to operate a pharmacy for the best good of all concerned. This comes only by actual contact with the cold world; and since the institutions of learning cannot impart this information, it is the height of folly for them to include it among the requirements for a degree. They have no means of determining a student's practical worth in a store, and without good reason, assume the responsibility of work that State Boards of Pharmacy are paid for doing. There is no more reason for a school of pharmacy acting as guardian over its graduates than there is for such action on the part of a school of medicine, or law, or theology.

In the popular sense, the primary object of shop practice is to gain a knowledge of the principles of trade, and this is directly antagonistic to higher and nobler education. Mercantile pursuits narrow and harden a man to a condition of selfishness that practically displaces all inherent regard for the rights of others, and he soon finds himself unscrupulously regarding all men as his legitimate prey. Education, on the other hand, broadens and mellows him to a sense of magnanimity that justly commands the respect and support of his fellows. Education is the dynamo which supplies the current of thought and directs the mode of action; the current is equal to the electro-motive force minus the resistance; resistance is anything that interrupts the current of thought, and the best system of education is the one possessing the greatest freedom from interruption. Fortunate is the student who selects such a school, for after running the gauntlet of its curriculum, he will find himself capable of absorbing more practical hints in one year than he could have done in two without such training.

To include shop practice in the requirements for the pharmaceutical degree is an injustice to the student, and an unnecessary, if not unwarrantable assumption on the part of the school. For the protection of himself and the public, this part of the pharmacist's education is necessary, and the best place to get it is not where it is, at most, only vividly portrayed, but where its existence is real and active; where *push* is the motto in-scribed on the door, and success the reward of persistence and skillful application.

Science is the basis of the pharmacist's education, and art is its application to the problems of life. Schools are the offices of architects, who lay out the plans for life structures; science is the material for construction, and students are the workmen who collect and put it together. The primordial part of any substantial structure is its foundation; so the foundation of the science and art of pharmacy, education, should precede practical experience, which is the superstructure, never completed, but constitutes the life work of the pharmacist.

ANSWERS TO SOME QUERIES OF THE SECTION ON LEGISLATION AND EDUCATION.

BY F. J. WULLING.

QUERY 1. Should students of Pharmacy be required to give evidence of having had experience in a drug store before permitting them to graduate or register, regardless of quantity or quality of knowledge possessed?

It seems to the writer that when a college issues a diploma to a student, such diploma can adequately be only a guarantee that the student holding it has satisfactorily pursued the courses of study in and passed examination at the college issuing the diploma. A college can adequately regulate and supervise only the work and study carried on at the college. It would seem that the jurisdiction of a college over its students does not extend to a supervision of the work carried on external to the college, nor does it appear to the writer that so reliable and efficient a system for supervising such external work or experience can be formulated that the latter can be recognized and guaranteed for, upon the basis that the work completed at the college is guaranteed for by the diploma. The requirement of "so and so much experience in a dispensing pharmacy" is too vague—the requirement would be of better service to the student and to pharmacy if the nature of the experience were explicitly defined. It would then be of greater utility than it now is, but even then it could and would be circumvented in many instances.

It appears that the matter of experience outside of college is a question for regulation by the Boards of Pharmacy rather than by the colleges of pharmacy. The Boards ought to be vigorous in their investigations regarding the quality and quantity of experience possessed by applicants tor registration; length of experience certified to by a written statement of a person not personally known to the examiners is not a safe criterion for the judgment of the experience of an applicant.

QUERY 2. Should such students give their whole time, during College years, to study, or divide it between attending College and working in a store?

Unless students be exceptionally intelligent and receptive, they cannot efficiently and satisfactorily complete competent college work in two years while serving in a pharmacy. A thorough college course to be completed in two years, ought to occupy of the student's time the greater part of each day in work at the college and the remainder of the day in home study. The time between the conclusion of the first year and the beginning of the second may be profitably spent in pharmacies.

It is the writer's belief, based upon experience with two persons, that two years' experience after the completion of a college course is of greater benefit to the student than two years' experience before college work. The knowledge gained by students before entering college is usually haphazard and abstract, and a good number of students are shrewd enough to learn that they can pass examinations sometimes and carry on their vocation, in a way, with knowledge a good deal short of the maximum which can be obtained or acquired at college. Many students, most of them, who obtain their experience first, do not receive the incentive and stimulus from their employers which would impel them to greater exertions towards acquiring proficiency. On the other hand, the student who first equips himself with a college education, which is here meant to be a complete and comprehensive one, including much laboratory training, is full of ambition, encouragement and incentive gained from his teachers; he is, besides, methodical and systematic, and above all is in possession of the intrinsic knowledge which enables him to quickly master the problems which to the untutored apprentice are usually Greek, and remain so.

QUERY 3. Can a minimum standard of time of attendance and quality of pharmaceutical education, be adopted by American Colleges?

Yes, by co-operation.

The writer submits the following brief synopsis of what appears to him to be a minimum of time and work to be satisfactorily completed by students before they be permitted to graduate:

Two (2) courses of at least eight full months each, each course in separate years.

Pharmacy, in each course, 3 one-hour lectures and 8 hours' laboratory work weekly, to include metrology, nomenclature, pharmaco-technology, the pharmacy of the metals and their salts and of non-metals, gravimetric analysis, the pharmacy of organic drugs and their preparations, assay of 4 drugs, pharmaceutics to include the manufacture of the following official preparations—10 tinctures, 4 fluid extracts, 4 mixtures, 2 oleoresins, 2 resins, 4 extracts, 8 solutions, 8 ointments and cerates, lead plaster, 4 powders, 4 lozenges, 4 emulsions, all methods, all of the U. S. P. pills, 4 spirits, suppositories, bougies, etc., all of the scale salts of iron, 6 salts of each of the important bases and 2 of the less important, standardizing 2 fluid extracts, dispensing 40 selected prescriptions, etc.

General Chemistry, in each course, 3 one-hour lectures and 6 hours' laboratory work weekly, to include metals and non-metals, chemical philosophy, complete inorganic analytical, and toxicological chemistry.

Pharmaceutical Chemistry, in each course, two one-hour lectures weekly, with enough laboratory work to learn the application of *all* the tests of identity, purity and strength in the U. S. P., with knowledge to write equations for most reactions.

Organic Chemistry, in second course, one one-hour lecture and 3 hours' laboratory work weekly; preparation of ether, chloroform, spirit of nitrous ether, etc.; ultimate and proximate analysis, preparation of some of the new remedies.

Materia Medica, in each course, 2 one-hour lectures weekly upon vegetable drugs, non-metals and salts of metals, new remedies.

Pharmacognosy, in first course one hour weekly, in second course two hours' work weekly, including lecture and laboratory work.

Botany, in first course two hours weekly, including laboratory work, phenogamic organography, comparative anatomy and embryology, histological and systematic, to proficiency in the use of key.

Physiology in first year, one lecture weekly.

Urinalysis—complete chemical and microscopical, normal and pathological.

Latin, in first year according to Robinson.

Pharmacopœia—complete familiarity.

The requirements for entrance to colleges of pharmacy should be equivalent to a complete high school education.

QUERY 5. What objections can be urged against bestowing the degree of Doctor in Pharmacy upon Graduates in Pharmacy who take a post-graduate course?

None, *providing the course be adequate.*

The argument that physicians would object to the title "doctor" for pharmacists is not sustained by the writer's inquiry among physicians. Physicians have no right to the monopoly of the title, nor do they as a rule claim to have it.

QUERY 10. Should graduates in pharmacy be compelled to pass the examinations of Boards of Pharmacy before being registered?

Graduates in pharmacy from recognized colleges ought not to be required to pass examinations for registration by Boards of Pharmacy, providing the Boards are convinced that the practical experience is of the first quality.

QUERY 14. Should any candidate be permitted to graduate in pharmacy before he is able to apply the tests and assays of the United States Pharmacopœia?

No.

QUERY 18. Should candidates for graduation in Pharmacy be able to make all preparations, a process for which is given in the United States Pharmacopœia?

Decidedly *yes*, and they should also be thoroughly familiar with the theory of the methods for the preparation of all official bodies for which no process is given in the Pharmacopœia. Students in Pharmacy should not be permitted to graduate until they have acquired a complete understanding of and familiarity with the Pharmacopœia.

QUERY 20. Would it be a gain or loss to Pharmacists to compel would-be apprentices to pass a Board of Pharmacy examination on their general education before permitting them to begin work in a drug store?

It would be a decided gain to pharmacy, and should be an institution of the very near future.

QUERY 21. Should Boards of Pharmacy publish from time to time, in the Pharmaceutical press, their past examination questions as a guide to future candidates of the nature of the subjects upon which they are expected to pass?

No; prospective applicants for examination collect them, study them up and pass on them, rather than use them as a criterion of the nature of examinations.

A motion was then made by Dr. Payne and agreed to, that the papers thus far read be discussed.

MR. FENNEL: I would like to say something in regard to the paper of Mr. Whitney. I agree with him as to his final answer to Query 10, but not for the same reason. The reason given by Mr. Whitney it seems to me casts a reflection upon the colleges of pharmacy and I feel satisfied that Mr. Whitney does not intend anything of the kind. I feel further satisfied that the graduates of every college of pharmacy are competent to come before a Board of Pharmacy and pass their examination.

MR. WHITNEY: It seems to me that I ought to answer that remark. This paper was not designed to reflect upon any college of pharmacy. I only judge from my own personal environment.

MR. HALLBERG: In the paper read by Prof. Oldberg there appears the following statement, "but the language used in the annual announcement of colleges of pharmacy which offer to aid their students in their efforts to obtain employment during their college attendance, indicates plainly in every instance, that the object in view is not instruction but wages, and in no instance do I find a college announcement recommending that students secure employment for the purpose of rendering their college course more effective." Each student should be occupied all the time. The hours should be arranged so as to compel the student to spend part of his time in the store to defray personal expenses; it is especially desirable for junior students, who may lack practical experience. I think most of the colleges of pharmacy in their announcement take the position, that there is great value in the city store experience to a great number of young men that come in from the interior.

MR. REMINGTON: This paper of Prof. Oldberg is one of the most ingenious instances of special pleading that I have ever seen. He sets out with a proposition in opposition to a great many of the methods which have been successful heretofore in teaching pharmacy. Now he says: "But such irregular interrupted employment as college students can get has no educational value whatever. Besides, we are informed by the annual announcement of the colleges of pharmacy that only a limited number of students can be provided with (partial) employment in the drug stores during the sessions." That is not the case as he has stated it—the limited number of students that can be provided with employment in a drug store simply means that a great many students go to such colleges of pharmacy—I am not speaking of my own college, but of a majority of them—who do not have a sufficient amount of experience to obtain their degree; hence they are offered a limited number of situations, for no college wants to stand up and guarantee to every student writing to them that they will give him a situation. The object of stating that "limited number" is to place before them the fact in a proper way, and not that they will get situations. The language is very plain—a limited number of students can be provided for. Now the facts are, I believe, that instead of a limited number, a great many students are provided with situations: but that is not the question. There are one or two points very ingeniously worded, that place the colleges in the wrong light, and I do not think it is the right thing to do. But as to the general question, I take it that one of the best things about the education of pharmacists in any country is that we are in a far better position than many professions. Take the doctor, or the lawyer, or the student of divinity. He gets no opportunity whatever of practicing his profession while he is learning it. At the same time I maintain that for the profession of pharmacy, one of the best things about it is, that the student, while he is learning, can at the same time have the opportunity of putting into practical use the knowledge that he has acquired, and also get information from the drug store while he is getting his knowledge. Now, I admit, Mr. Chairman, that it will be greatly to the financial advantage of many colleges of pharmacy, to throw the students into the college, and to be entirely independent of the druggist, and to say: "Here is the place to educate you. Here is the place to give you everything." Can we do it? We cannot. The college of pharmacy cannot educate a student so that he is ready to go out and practice his profession. I tell you he must have this help in the shop, and there is no college in this country that can educate a young man sufficiently to make him a druggist until he has had an opportunity of spending some time in a drug store. Now, I hold that the American Pharmaceutical Association will not approve of doing away with this tremendous factor in pharmaceutical education. The great calling of druggists is to help the college to give that man an education.

Now another question: a most important difference between the curriculum when the student devotes his whole time to the college and spends his time in the laboratory course. I know the laboratory courses in colleges of pharmacy have developed of late years wonderfully, and it has been one of the best things about our pharmaceutical education. I also wish to say that Prof. Oldberg has done a great deal in aiding pharmaceutical education in this country by developing laboratory instruction, and I would not have him for a moment discouraged; I would not have any college discouraged from getting all the laboratory attendance that is possible; but this question as to whether the student in a college should give his whole time to the college when he is at it, is a different thing, and the student is under a very great disadvantage. Now I wish to say that that depends upon circumstances. If the college student had a preceptor, an earnest preceptor—and no preceptor I think should be anything else—he should conscientiously teach him, or he ought not to take him into his employ with the understanding that he was to teach him his business as one of the highest duties to perform for that young man. It is an important duty outside of the question of wages and pay, to give that young man instructions—I say it is his bounden duty to that young man to give him the best instruction he is capable of giving him. He should not say, I do not feel competent or qualified; he should at least give that student plenty of time for his studies, and should aid him in getting his education. Now when we come to this question as to the practical results, I believe that with even moderate instruction in a drug store to supplement instruction in the college, we get the best results. There are two sides to this question, and I believe of late years as far as I have been able to study the subject and observe it, we are getting into two classes, two kinds of colleges of pharmacy: in one we solicit the help of a preceptor and his sympathy, and get him to give his help to the young man; and in the other we throw the preceptor overboard, and say, in this college of pharmacy you can get all your practical knowledge, and when you go away from here you can then get your own store experience; we prefer that you should not have any store experience. Now the truth I believe lies largely in the middle course. It does not do for one advocate to say the preceptor cannot teach him anything, or if he teaches him anything he will have to unlearn it when he gets to the college. That is one side of the question. The other side discourages the college student, and says, you cannot learn anything at the college. Many a time I have heard the old rule-of-thumb druggist say—what do you go to your college for? I can teach you far more than you can get at the college. We hear this all the time, and I am glad that the other side have able advocates, as I want to hear the best that can be said and the known facts. The institution I represent is giving the best education it is capable of giving, and I dare say that is the feeling of every college; but that is no argument—no argument which convinces me that the time has come to throw store training aside, or to throw upon the world the earnest student who has completed his college course, and at the same time has got to get his experience after the professors have left him and pay him no more attention at all.

THE CHAIRMAN; Now Prof. Remington has been talking ten minutes.

MR. REMINGTON: I beg your pardon, I did not know it; I thought I was only talking for five minutes.

THE CHAIRMAN: I would like hereafter to limit the time to five minutes to each speaker except Mr. Oldberg. Any one else who speaks must be limited to five minutes, and his time will only be extended by the consent of the Association.

MR. MORRISON: Mr. Chairman and Gentlemen: I would like in the first place to correct two errors which I have noticed in Prof. Oldberg's paper on "A Minimum Standard for Pharmaceutical Education." The first is "Compulsory college education has recently been established even in Ontario and Quebec, Canada, and in Victoria and Queensland, Australia, in which countries the retail drug business is carried on in the same way as in America." Now I wish to say that compulsory Pharmaceutical College training has been established in the Province of Quebec for the last twenty years, since 1874, and also a preliminary examination—in Victoria, Queensland only for the past year—in the Province of Quebec twenty years ago—in Ontario almost as far back; so that that word "recently" is a mistake. Another point to which I wish to call your attention is, with regard to the conferring of degrees. Prof. Oldberg says in his paper: "It seems to me that each College of Pharmacy might give two degrees, one representing a shorter course of study, and another a longer course, the same as is given in Great Britain—one representing an additional two years of extra work." Now the School of Pharmacy in England does not confer any degrees at all—the Pharmaceutical Society of Great Britain confers two degrees: that is, one is called the minor qualification, and the other the major qualification. Both degrees are practically the same, that is to say the holder of the minor degree can open a drug store and carry on the business of a retail pharmacist, but cannot use the title of Pharmaceutical Chemist. As regards the question of two different distinct degrees, I think it would be a mistake. Now with regard to the different degrees as conferred by the Pharmaceutical Society of Great Britain, as you see, there is no practical difference between the two. It does not confer anything upon the Pharmaceutical Chemist in the sense of qualifications or duties, which the druggist is not able to fill at the same time. Now in France this question of two different degrees is undergoing considerable discussion at the present moment, and there are, as you are aware, two classes in pharmacy, the primary class and the second class—first and second class pharmacists. There is a discussion among the pharmacists of Paris to have only one degree, and I believe that is right. We should endeavor to raise the standard all around and not make two standards, or bring the present standard down to a level which will reduce the value of the degree of Graduate in Pharmacy. If anything, I think that the degree of Graduate in Pharmacy should be elevated, that is, the qualification and examination should be made a great deal stricter. As regards the question of college students dividing their time between store and college, I would have said something about it, and would have expressed my opinion upon the subject, but Prof. Remington has so ably expressed my views upon it, and as I should have taken the same grounds that he has, I think I will not occupy your time.

MR. MASON: I think if Mr. Morrison were to present himself at Bloomsbury Square he would find considerable difference between the minor and major examination: at the same time, a man who passes the minor examination is qualified to open a shop of a chemist and druggist in England, while the man who passes his major examination is qualified for election as a member of the Pharmaceutical Society of Great Britain, and has to pay a fee as a member of Council; in Great Britain he calls himself a Pharmaceutical Chemist; one of the advantages he has over the chemist and druggist, is that he is exempt from jury duty. Another question which is important is the relation between the two examinations and what they carry with them.

MR. ALPERS: When Mr Oldberg read his paper he was loudly applauded, and when Mr Remington spoke against him he was more loudly applauded; which shows that we agree with Prof. Oldberg, and we agree still more with Prof. Remington. That is to say we are willing to give students all the facilities for study, and to give them all the time for study, and we are just as willing, and still more willing, to give them all the chances for obtaining practical experience that they may wish. On these two points we certainly agree, and on these two points Prof. Oldberg and Prof. Remington agree; the question being only how shall it be done, and how can it best be done. I have always in theory maintained that you cannot divide the time; a man cannot serve two masters at the same time. To compel a young man to work in a drug store from 7 o'clock in the morning till 6 o'clock at night and then to go for two hours to the college, is a strain that only a few can stand: they must neglect the one or must neglect the other. The mind is not fresh and ready to receive instructions when it has been kept busy for ten hours of the day, and, therefore, if the two, the college education and the practical education, shall go hand in hand, it must be on a different basis, and on different terms; that is to say a college education should commence in the afternoon, and the practical education should be restricted to the morning. If such an arrangement can be made with the preceptor I believe that it will be useful. I do not believe though, as I said before, that it is possible to recommend any college where the lectures are only held at night, and where it holds itself out to give employment for wage earning—only a few hours at night, when the young man should rest and go to bed, to be devoted to a college education. That is one point. The other point is found in Prof. Remington's argument, which was able and exhaustive, and was concluded with the words, "provided the preceptor is the right kind of a man." Yes, provided he is—but is he? I ask all practical druggists present here, who may be called upon to act as preceptors, do they instruct young men—do any of them do it to-day? And is not this young man required in ninety-nine cases out of a hundred to devote his whole time to the selling of soda-water, and attending to such duties as should not be intrusted to a junior but should rather be left to a senior or experienced clerk. Is that kind of practical experience useful in a college education, I ask you? If the preceptor is the right kind of a man, certainly he will be of immense help: he will be a man who will give up a great many things for the sake of giving the young man the college education; he will do the best he can by him, and will act for his interest, and give him such knowledge as he cannot obtain at college; he will encourage him in practical work, and recognize his conduct of the work, and in these different ways bring him out. If this state of affairs can be brought about, it is an ideal state in my mind; but the trouble is that a majority of preceptors, if I may make use of those words, although it is almost an insult, the majority of store-owners to-day do not care a snap about it, and they don't want their boys to go to college. They will say to them, "you may go, it is the custom; if you cannot help it go there—I don't care about it, it don't amount to anything." That is the general talk that you hear in the stores; and, therefore, if you can improve this practice in such a way that the morning will be devoted to practical work, and the afternoon and evening to college work, then agree with both.

MR. HALLBERG: I would like to say a word with regard to the college I represent. We do not tie our students down or allow them to throw away all practical experience—we do not throw that overboard, and we do not say that the experience a man gets in a store is not worth anything. We do not say, you must not do anything outside of the college—you are here on probation for three months; but we say if you do, it is to your disadvantage in your department work, and you are subject to the disadvantage, and you must put in a three or four years' course.

MR. SCHLOTTERBECK: Regarding the school which I represent, I would say that although students intending to graduate in two years are required to devote the entire time to their studies, if they desire they are allowed to divide their time for the purpose of gaining a livelihood. They do it, however, with the understanding that the time of study must extend over a longer period of time than two years. Such a student is generally placed on probation for three months, at the end of which time an intelligent adjustment of the work can be made. Far from throwing experiences overboard as valueless, we advise it in our annual announcements; but when we consider the condition in which practical experience in the United States is to-day, we cannot assume that responsibility and require it for graduation.

MR. FORD: The paper refers to every graduate of pharmacy, and the gentleman is referring to requirements entirely different. Every graduate of pharmacy is a pharmacist, only a pharmaceutical chemist is not necessarily such.

THE CHAIRMAN: I think the paper bears in that direction.

MR. EBERT: The point is not well taken at all—the question is, should pharmaceutical college students divide their time between the shop and the school?

MR. SCHLOTTERBECK: If experience in the drug store were of the nature that it ought to be, as has just been stated, then we would be ready to consider it, but unfortunately such is not the case. If the time of the student is to be divided, the time of instruction must naturally be lengthened, and in place of completing the course in two years, the student must devote three or even four years to study before graduating. We are always glad to see and help a deserving man get an education by doing outside work, but he cannot, of course, complete the regular course in two years unless he be exceptionally bright.

MR. HALLBERG: We listened this morning to one of the best addresses concerning education in its broad sense that it has ever been my pleasure to listen to. The Chairman referred to education as meaning the value of a habit. Now, what is the best habit of a young man engaged in pharmacy, if it is not the habit of cleanliness, order, neatness, punctuality and politeness in meeting customers, and in a thousand other ways? If this is not the most valuable habit at the present time, I would like to know what possibly can be? I know that druggists throughout this country are complaining that during the last ten years especially, they cannot get a clerk that will relieve them and serve their purpose. They do not find any special fault with him; he is able to put up prescriptions, and he is pretty well posted, in fact, sometimes he is too well posted, but the proprietor cannot depend on him. He is not such a man that will take an interest in his business, and take care of the little details, and the duties upon which the success of the pharmacy depends, as he was accustomed to do for his master forty years ago, when he learned the business, and thought it was of great importance. I consider that when a man has graduated, that is when he is given the title of Pharmacist, that should really mean that the man is not only qualified in the theoretical sense, but that he should also be a thoroughly safe man to be placed in a pharmacy. Why? Because if that be not the case, it is a reflection upon the colleges, and the statements made occasionally by druggists—the rule-of-thumb men, as mentioned a while ago—are due to the fact that there are young men being graduated during the last five or ten years, who have not that practical experience, and therefore it reflects upon all the colleges. Now, I say no more about training, and nothing further about the value of experience, except this, that I believe the experience should precede the theoretical education; that is, the preliminary experience should be had first, and if we can, we should make such an arrangement that the practical experience should go hand in hand with the theoretical education. Then we will have the very best results. The statement made by Mr. Alpers here about evening instruction is a true one. Only two or three colleges—there are only three colleges out of forty—give evening instruction; it is not necessary to mention the names of the colleges. In one college I know positively the hours of instruction commence at nine o'clock, three days in a week for the Juniors—from nine to one—with an intermission of one hour and a half, in which practical work is done, and then from two to four lectures, and demonstrations, and then from four to five classes, and then the evenings are free. Now, this institution endeavors to have the Juniors make an arrangement by which they can get three days in the week entirely to themselves—Tuesday, Thursday and Saturday, with the corresponding evenings to themselves; the other days, Monday, Wednesday and Friday, to be devoted entirely to the store. I will close now by calling attention to a little incident which illustrates to me the great value of having a store education when joining a college of pharmacy. When I attended the Philadelphia College of Pharmacy, twenty years ago, I had been four years in a country store, where we made no preparations. On coming to the city I entered a city pharmacy, where I learned more in six months than I had learned in four years previously in a little country store. I remember that Prof. Maisch lectured on cinchona. He had two specimens, the red cinchona and a spurious bark; he applied various tests, and when I reached home that evening I found a piece of red cinchona, and tested it, and saw the crimson red fumes rise from that drug. That test I never would have performed if I had not had a store back of me at the time I attended college.

MR. SHEPPARD: I do not propose to make a long speech on this subject. I suppose a man's convictions can best be expressed by his actions. I simply want to express my belief, which is a result of my practice with my own clerks. I have been sending drug clerks to college for twenty-five years, and for the last 10 or 15 years of that time my invariable practice has been never to let the boy go to college until he has been in my store at least one year, and I discourage the idea of his graduating until he has been in college three or four years. I always decidedly encourage him when he reaches the senior year, to give up store work entirely during the college course, and to come back to me during the summer time and to keep in touch with the store in the evenings, and at such other leisure time as he has. I believe in keeping in touch with the store so as to have the store behind him, and to give the whole time to the college during the senior course.

DR. BARTLEY: A special report of the committee is up for discussion, is it not?

MR. EBERT: I want to say something on that before you bring that up.

DR. BARTLEY: I might say what I was going to say.

MR. OLDBERG: The gentleman is not speaking to the question before us.

THE CHAIRMAN: Would it not be well for you to speak to the question before the section?

DR. BARTLEY: Under the question we are speaking on we cannot defend anything that will influence practical legislation. There are now existing on the statute books of many of the States, legislative requirements with regard to the practice of pharmacy, and which pharmacists are compelled to carry out. According to the recommendations of Prof. Oldberg and some others, the student is recommended to give up his whole time to the college, and the time spent at the college cannot be counted as part of the experience required by the statutes. The statutes require four years' practical experience, or three years' practical experience in a store where physicians' prescriptions are compounded. Now, an attendance on the college cannot be regarded as a store experience, and when the time spent at the college is mixed up, as it is very often, with the experience in the store, it is so divided that the time spent at the store is sufficient time, so that it counts for so much experience. Consequently the student must have four years' practical experience before he graduates from the college, or really before he enters college, if he gives up his whole time to it, because the Boards of Pharmacy, or those that I am acquainted with, do not recognize the diploma of any institution that does not require four years' practical experience in the drug store prior to receiving that degree. If he receives the degree on two years' practical experience, and then comes to us after six years' of experience had after receiving the degree, we cannot recognize the degree, we always oblige him to take the examinations. I am in favor of requiring examinations of all candidates. The Boards with which I am acquainted receive a great many certificates from foreign countries, and it is difficult to really get at what the requirements are upon which the certificates are granted. That gives us a great deal of trouble, and this would be a great relief when we come to examine the candidates.

MR. EBERT: I want to say something on this subject, and I want to say it from the standpoint of a druggist, and not from the standpoint of a teacher of a college of pharmacy, or that of a member of a State Board of Pharmacy. It simply goes to show what we have heard, that there has been a variation in the teaching of pharmacy from what it was twenty years ago. Prof. Hallberg has referred to a time some twenty or twenty-five years ago, when he attended a college of pharmacy. It was a very good thing to divide our time by attending to the store and attending to lectures. Why was it so? The old curriculum at that time was teaching by lectures—lecture teaching—and it was absolutely necessary that there should be also practical experience, and that usually was gained as Mr. Hallberg very clearly demonstrated, by doing experimentation. This is now done in the laboratories of the college, where before it was done in the store. Now, therefore, it seems that if colleges are properly equipped for laboratory work, it is not necessary that the student should perform this experimental work—do this work in the stores in which they are employed. But, gentlemen, this is the ground, and it is an essential thing that we should reqnire. The first thing to be required of a student who seeks to enter a college of pharmacy is that he has had three or four years' practical experience in a drug store, and the student should not be taken into the school without previous experience. No college of pharmacy should allow a young man to enter the portals of their school, without having had three or four years' practical experience in a drug store. Then take them into your school and give them all the theoretical education you please. I tell you, gentlemen, that we had better learn from the older schools of Germany and France, and even England can show us that practical experience should be followed by theoretical teaching. The trouble is with us that the schools are so anxious for students, that they take them in, and wish to make them pharmacists, and give them a degree, without their having had a day's experience in a drug store. They then want them afterward to gain that practical experience. They never can. It is essential for the pharmacy of this country that the practical experience should be gained before the young man is allowed to enter the college.

DR. DOHME: I have not had very much experience in educating pharmacists, and in that particular I do not want to set myself up as an authority, but I will say this with reference to this question. It seems to me that pharmacy is advancing with other sciences, and that pharmacists twenty years ago, in the days when Prof. Hallberg attended a college of pharmacy, had less to learn than the pharmacists of to day, because the amount of work that is required of the men, the methods of investigation and study, have increased in those twenty years. I will only cite in this particular the work of the microscope that has been introduced, and you will realize the importance of it, and the importance of it will increase to you as you employ it, as we learned from Mr. Kraemer a few days since. Now it seems to me if there were only two years, or only one year required for education formerly—it will not hold as an argument to-day, twenty years afterwards, that that amount of time will suffice for that purpose. Taking it for granted that the student requires the same amount of time in the drug store now as he did then, he certainly requires more time in college, and most certainly more time for study. I agree fully with Prof. Oldberg that the time should not be divided between the college and the shop, and I am convinced that in nine cases out of ten a man will profit more in every particular in the practical laboratory course in pharmacy than he will in the shop he happens to be connected with. In this particular Mr. Alpers certainly spoke to the point—for can a proprietor of a drug store be expected to know as much and be as well posted as the professor of a reputable college? A chemist learns all that is necessary for a successful career in the university—so does a doctor—why shouldn't a pharmacist? Now with reference to Prof. Oldberg's suggestion, I think that there is some misunderstanding. I think Prof. Oldberg does not expect, from the conversation I have had with him, that a man because he has received his degree of graduate in pharmacy, should thereby be entitled to practice pharmacy. On the contrary, I think that he proposes that after the student has had a scientific education, and received his degree, he shall gain his shop experience, and above all pass an examination before a Board of Pharmacy before he can practice his profession. This point is well taken. The fact that a man has a diploma should not entitle him to practice his profession—it should only be the means of enabling him to pass what should and does entitle him to practice his profession, and that is an examination before a Board of Pharmacy. He bases his argument upon the analogous process employed in Germany, where although a man has a degree of Doctor of Medicine, he is not entitled to practice medicine until he has passed a State Board examination. In conclusion I should like to question the value of Prof. Hallberg's argument about the advantage to an individual of drug store practice during attendance upon college, by asking him if he could not have performed the experiment of placing a piece of cinchona bark in a test tube and heating it in the presence of certain substances, to detect by the color whether it was genuine calisaya bark or not, just as well in the college laboratory as he did in the drug store immediately after the lecture of Prof. Maisch.

MR. HALLBERG: May I take one minute to reply to that remark? I would say in reference to that experiment that such experiments can be performed in the laboratories of the colleges now, but they could not be performed then. The colleges have obtained those facilities since.

MR. OLDBERG: Unless there are others who wish to take part in the discussion, I would say—

THE CHAIRMAN: We will never get through with this paper—this is interminable.

MR. OLDBERG: I shall not occupy much of the time of the gentlemen present, and will faithfully confine myself to answering the objections made to my paper.

In the first place, Prof. Hallberg made the statement that my paper contained an error or a misstatement of fact, to the effect that the announcements of the schools of pharmacy give their students a chance to obtain employment for the sake of the wages simply He read from my papers as follows: "But the language used in the annual announcements of colleges of pharmacy which offer to aid their students in their efforts to obtain employment during their college attendance, indicates plainly in every instance that the object in view is not instruction, but wages, and in no instance do I find a college announcement recommending that the student secure employment for the purpose of rendering his college course more effective. Pharmaceutical college students who work in drug stores while at college, do so, with rare exceptions, solely for the sake of the wages they are able to earn to help pay their expenses. But any student who by reason of limited means finds it necessary to earn a part of his expenses by rendering any kind of service for wages, must, of course, at the same time submit to a corresponding loss of time in his school work."

To show that these statements are not true, Prof. Hallberg then read from the latest annual announcement of the Chicago College of Pharmacy the following paragraph: "While the lectures and laboratory exercises present to each student enough mental and physical work to occupy his whole time, still the hours are so arranged as to permit students who so desire to serve a part of their time in stores, thereby defraying their personal expenses. This is especially desirable for Junior students who may lack practical experience in a city pharmacy. With three days and every night in the week to themselves, their services in a pharmacy may be worth sufficient to pay for board and lodging, and competent students find little difficulty in securing situations."

I am quite willing to let this matter rest upon Prof. Hallberg's own statement.

Next, as to the very able and eloquent declamation of my respected friend, Prof. Remington, in reply to his objections to some of my statements which he is pleased to call "ingenious special pleading." I will make but brief reference to his specific objections. In my paper I stated that the annual announcements of the colleges of pharmacy which are conducted on the assumption that the students ought to be employed in drug-stores during the college course, tell us that only "a limited number" of students can be provided with such employment, and I expressed the opinion that "a system which benefits only a limited number of the students is surely not to be commended." But Prof. Remington explains that quite a number of students at the colleges have already had sufficient experience in drug stores to graduate, and that what the colleges mean when they say that only "a limited number" can be provided with employment, is that this limited number consists of those who must get some more experience in order to be able to graduate. Now I would call *that* special pleading.

Prof. Remington announces that he believes the store ought to help the college in its work. That is simply his opinion. I do not share it. I believe, on the contrary, that the school is amply able to impart instruction without the assistance of the store, and, indeed, that it is better able to impart that instruction without it than with it.

He objects further to my statement that the main difference between the course of instruction in a school where the students devote half of their time to drug store employment and the course in schools where the student devotes his whole time to his school work may be found in the amount of laboratory work. Statistics bearing upon this subject have been published and they speak for themselves. The total instruction of every kind in the schools where the student gives half his time to the drug store averages about thirteen hours per week and the average laboratory work is less than six hours per week, while in those schools that occupy the student's entire time the instruction amounts to over thirty hours per week, of which twenty hours is given to the practical work in the laboratories.

He speaks very earnestly about the duty of proprietors in helping the students to master their studies, but we have not enough Sheppards or Eberts, or other like men, who will give instruction to students. As a matter of fact we have about from 130,000 to 150,000 employed in the drug business in this country, and probably not over 10,000 of them have had adequate special college training in pharmacy. What kind of preceptors will the employers make under such conditions?

MR. HALLBERG: That is not true, Mr. Chairman.

MR. OLDBERG: Then Prof. Remington leads us to infer that there are colleges who would say to the students, "Come to us, we will give you all you want;" but I do not believe any school of pharmacy ever said or will say that. I agree perfectly with Prof. Remington in what he has so emphatically stated, that drug store experience is absolutely necessary to a complete education of the pharmacist; but I contend that the school is not the place where store experience can be had, and that the college session is not the time during which it should be obtained. One thing at a time, is my rule.

In reply to Mr. Morrison, who comments upon the paper I read during the first session, I will thank him for the correction he makes of my statement that pharmaceutical education has been made compulsory in Quebec only recently. He informs us that it has been in effect there for twenty years; but he is certainly in error when he claims that I stated in my paper that the Pharmaceutical Society of Great Britain confers any degree. What I said was, that "It seems to me that each college of pharmacy might give two different degrees—one representing perhaps one full year's work substantially as in the School of Pharmacy of the Pharmaceutical Society of Great Britain—and another representing an additional year's full work." Thus, my reference to the School of Pharmacy of Great Britain relates to the course it gives, and not to any degree.

MR. MASON: It is not a sine qua non, it is optional.

MR. OLDBERG: I did not say it was compulsory.

MR. REMINGTON: May I ask a question? I know Mr. Mason is well known to the greater number of the gentlemen present, and Mr. Mason is, I believe, a member of the Pharmaceutical Society of Great Britain, and I feel sure that what he says is correct.

MR. OLDBERG: I am sure I do not doubt his statements at all.

THE CHAIRMAN: Mr. Mason handed me a statement of his speech, and the reporter has reported it and so it will appear in the transactions.

MR. OLDBERG: Prof. Hallberg speaks of the value of habits of cleanliness and order. I cannot admit that these cannot be taught in the schools. He also speaks of the importance of graduates in pharmacy being able "to meet customers." Well, I will admit that we cannot make good salesmen in the schools. I will say, too, that such habits as belong peculiarly to the store, will have to be learned in the store. He thinks that some graduates of recent times are too well posted for the proprietors. Well, so much the worse for the proprietor. Prof. Hallberg is no doubt right when he says that he found six months' experience in a city drug store in Philadelphia much more useful than four years' experience in the country; but I would ask, are the graduates that come from the colleges of pharmacy limited to those who have had experience in city drug stores, or are not a considerable number of them graduated who had all their experience in country stores? Does any school which requires practical experience for graduation insist that that experience shall have been obtained in a city drug store? No, they certainly graduate young men who come from country stores if they have had the four years' experience, and they will surely continue to do so as long as the experience requirement continues.

My friend, Mr. Sheppard, says that he encourages students during their Senior course to devote their entire time to their studies, and not to work in a store during that time; but if this is a good plan during the Senior course, why is it not a good plan during the Junior course also?

Prof. Bartley calls attention to the fact that some pharmacy laws permit the registration of graduates in pharmacy who have had four years' experience, and says that if the practical experience in drug stores is no longer made a requirement for graduation, the diplomas of the colleges cannot be recognized under those laws. My reply is that the Boards of Pharmacy should not recognize any diploma whatever. I would like to see all graduates subject to the Board examinations, no matter what school they come from. As to the pharmacy laws, I have seen some in which it is provided that any graduate of pharmacy in order to be registered as such, must have four years' experience in a drug store, while any body else that can pass the State Board examination may receive his license without having any practical experience. That is the kind of pharmacy laws we have.

THE CHAIRMAN: Your ten minutes are now up.

MR. OLDBERG: I am ready to close, but I wish first, with your permission, to make reference to the comment made at last session by Prof. Good. Prof. Good thinks our pharmacy laws are very defective, and that there is little hope of getting better laws. I am sure I agree with him that the pharmacy laws are not what they ought to be, but I do not agree with him in quietly submitting to the evil. We ought to try to get better laws. I wish to say also that the conditions of the present are entirely different from those of twenty years ago, and while present methods were undoubtedly suitable for that time, they do not answer the requirements of the present.

After having heard the objections to my paper, I have no reason to wish to withdraw anything that I have said.

MR. GOOD: I rise to a question of privilege. I am obliged to, by Prof. Oldberg's remarks. I want to answer that in the manner it should be answered. I did not mean to convey that idea. The idea that I did mean to convey was that I was discouraged about any benefit from any resolution we might adopt. Of course I would be perfectly willing to try it if I saw any hope ahead.

MR. PATCH: Mr. Chairman, I have been very much interested in following this discussion. I am in favor of pharmaceutical education, and I have compared its results with my own experience. We were compelled to work from seven in the morning until eleven at night, with two evenings off in the week, and those evenings given up to attendance at the college of pharmacy. No time was allowed in the store, and study had to be undertaken outside of the store upon other nights. There is much that can be said on this subject I believe, in looking carefully over the field, and looking at both sides; I am watching the development in my own field, and I am convinced that pharmaceutical education to-day has no bearing whatever upon that of twenty years ago, and I believe that the time is fast approaching when education in colleges of pharmacy will be absolutely divorced from the store, and absolutely advanced from the old legislation, which will stand as a matter of tradition. The degree will not signify that a man has had the practical experience, and it will not signify that the man is capable of meeting the customers, that he is a successful man, a commercial man, or anything else that means business in a commercial sense, or that he is adapted by training and thorough practical results. A drug clerk is of great value to his employer after four years' experience. I think this is recognized, and, as Prof. Hallberg has said, to the student the experience that he has for three months in the city drug store is worth more than any other experience, even an experience of four years in the country. How does it begin? How many look back upon those early days? How many have been asked whether they have had experience in a prescription store? I admit that there are colleges of pharmacy in which in one year they will teach a man more practical pharmacy than you will get in some stores in ten years. I speak guardedly when I say that. (Applause.) I have seen a man after five years' experience who did not know how to wash out a lime-water bottle; there are schools where a man is taught to wash bottles, graduates and dishes, a matter which his preceptor has absolutely overlooked; and then, so far as the actual experience is concerned, there are laboratories in the college of pharmacy which give a man more practical experience in dispensing in a single term than he would get in some stores in all his four years. He is taught to make pills, ointments, plasters, and to put up powders, and to make them neatly, and his experience is such that he can before a class of 150 men make a good showing of his knowledge. Out of such a class in laboratory training 20 per cent. will follow the instruction literally. I remember the year I was instructed, at the end of the term, the gentlemen all around the room were doing the same thing. The same bottle was placed before them—they all had to do the same thing, and they learned to arrange their apparatus, and to do the work in the most expeditious manner. Now, that is one side of this question. There is a good deal to be said in this matter on the other side, and I believe the time is coming when we are going to have men who come from these workshops who must be advanced, and they will be advanced on account of this training.

Mr. Dadd: Let us look at the facts face to face. Taking a young man into a store for practice is entirely gone. We can no longer take a young man into the store and give him the proper education for the business of a pharmacist. Our time is all taken up with commercial matters, so that we can give him no attention. We make no examination of the man, and we cannot tell whether the man is fit or not fit. That work should be delegated to the college of pharmacy. In a college of pharmacy they have a practical system that will fit the man in a measure. Then again, they leave it optional with the student to take his practical education before or after his college education. They do not determine that question. They only say he shall have so much experience. He can take it before or after, as he pleases, and that is left to his own election as a practical pharmacist. I would leave it entirely to the colleges to select the man best fitted for pharmacy.

Mr. Hallberg: I rise for a point of order—I want to know whether Prof. Oldberg did not close the discussion—that is what should have been done.

The Chairman: Prof. Patch introduced some other questions, We have a paper by Prof. Oldberg which has been passed over, and he has asked to have it read by title. It is entitled—Is shop experience necessary ?

Mr. Hallberg: I move that the paper be read by title and be referred to the Committee on Publication.

Agreed to.

MR. ALPERS: I move that all the remaining papers be read by title.

MR. OLDBERG: I might be permitted to make this statement with reference to this paper on the question—Is Shop Experience Necessary?—that I have presented the case as strongly as I know how. I think that shop experience is a necessary part of the education of a completely equipped pharmacist, but I also think that this experience should be had under such conditions that it will be of real value, and not mixed up with school work.

MR. SHEPPARD: I offer the following resolution:

Resolved, That this Section would request the Association to furnish it more time at future meetings, namely: three sessions instead of two sessions, as at present.

This resolution was unanimously adopted.

Dr. Slack presented an abstract of his paper on the compulsory examination of graduates in pharmacy by State Boards of Pharmacy, and then moved that a vote be taken on the question: "Should graduates in pharmacy be compelled to pass an examination before a Board of Pharmacy before being registered?"

Mr. Oldberg stated that the Association had already passed such a resotion, that students should be examined by State Boards.

MR. HALLBERG: I move as an amendment to the motion of Mr. Slack, that the question be presented to the Association next year.

Mr. Slack stated that the question had been discussed for one year, and that he thought the Association was about ready for a vote, and he insisted upon having a vote taken.

Dr. Bartley objected to this Section taking such action at the present time, claiming that it was contrary to the laws of several States. "What can the vote of this Section accomplish? We have had a presentation of this subject, and I need not say anything further about it. I shall vote against it."

MR. THOMPSON: I think to save time we ought to take some action—instead of wasting all this time. It will have no earthly effect, and we might as well adopt it.

The question being on the motion that the Section on Legislation and Education declare that it is the sense of this body that Graduates in Pharmacy should be compelled to pass an examination by State Boards, it was adopted.

On motion of Mr. Thompson, the following papers were presented by title, and referred to the Committee on Publication:

Should Graduates in Pharmacy be Compelled to Pass the Examination of Boards of Pharmacy before being Registered? By Henry R. Slack.

Should Graduates in Pharmacy be Examined for Registration? By O. Oldberg.

A Draft of Registration Requirements in Pharmacy. By C. S. N. Hallberg.

The Apprenticeship System. By Edw. Kremers.

The Drug Store and the College. By L. E. Sayre.

Microscopy and Colleges of Pharmacy. By H. M. Whelpley.

Practical Experience in Pharmacy and State Boards and Colleges. By W. Bodemann.

The Preliminary Education of Apprentices in Pharmacy. By O. Oldberg.

The Demands of Pharmacy upon its Graduates. By W. W. Kerr.

What Objections Can be Urged Against Bestowing the Degree of Doctor of Pharmacy Upon Graduates of Pharmacy Who Take a Post-Graduate Course? By Rob't J. Snyder.

Should All Graduates in Pharmacy be Able to Carry Out the Tests, Assays and Working Processes Prescribed in the Pharmacopœia? By O. Oldberg.

The Government of Students in Colleges of Pharmacy. By H. M. Whelpley.

A Report on Pharmacy in Different Countries. By A. P. Bernhardt.

A Few Words About Query No. 8. By W. Bodemann.

(All papers read by title will appear in full immediately following the Minutes of this Section.)

Mr. Hallberg moved,

That a vote of thanks be tendered to the author of the report on pharmacy for his compilation. It is a valuable work of reference. He has given us a report from two hundred conntries.

The motion was agreed to.

Mr. Sheppard moved that the report of the Committee be taken from the table, and Prof. Hallberg's motion in regard to the same be accepted --Prof. Hallberg's motion being to adopt the second resolution.

THE CHAIRMAN: The substitute offered by Mr. Ebert will first be considered.

The motion to take the report from the table was adopted.

Mr. Ebert then explained his substitute.

Prof. Remington spoke to the substitute proposed by Mr. Ebert, saying that the Committee would be entirely too cumbersome to treat the subject properly, and thought that the second resolution would be preferable.

Mr. Hallberg did not think that such action should be taken.

Mr. Ebert said he was willing to drop that, if the Section would take the other, and thought they had better call on the colleges.

Mr. Butler stated that the resolution offered was the result of a great deal of correspondence, and he thought that the three men on the Committee had worked very conscientiously, and moved that the first set of resolutions be substituted for the second, and the adoption of the original report.

The Chairman stated that the substitute was before the House, and that Mr. Butler's motion was not seconded.

The question being taken on the substitute of Mr. Ebert, it was lost.

The question occurring on the motion of Prof. Hallberg, to adopt the second resolution, the question was discussed by Messrs. Thompson, Hallberg, and Remington.

Mr. Sheppard moved to amend the second resolution by inserting the words "represented by members in the Society," after the words "of this country." The motion was seconded and adopted.

Mr. Thompson moved as a substitute the adoption of the first page down to the last paragraph. This was discussed by the Chairman, Messrs. Sheppard, Thompson and Whelpley, and was lost by a vote of 16 to 25.

The Chairman then read the second resolution of the Committee, as amended by Mr. Sheppard, as follows:

Resolved, That a committee be appointed consisting of one representative from each of the colleges and schools of pharmacy of this country represented by members in the Society, with three members of the Association, neither of whom are teachers in any pharmaceutical college or school. The duty of said committee shall be to take into careful consideration the condition of pharmaceutical education in this country, make recommendations relative thereto, and report to the Association at its next annual meeting.

On motion of Prof. Hallberg, the resolution as amended was adopted.

Mr. Beal offered the following resolution:

Resolved, That it is the sense of the American Pharmaceutical Association that the cause of pharmaceutical education ought to be advanced, and that all pharmaceutical schools and colleges should form an association for the purpose of regulating such matters as are for their common interest which do not come properly within the scope of the American Pharmaceutical Association.

The Chairman warned the reader of the resolution and the members of the American Pharmaceutical Association that the Association had nothing to do with such a resolution.

Prof. Remington suggested that, as Prof. Beal would be present at Denver, the Committee's second resolution should be adopted, and when the Association met in Denver these representatives could resolve themselves into an association.

The Chairman stated that this Association could not force them to do so.

Mr. Payne offered the following resolution:

WHEREAS, The position of pharmacists as professional men is not properly recognized by the U. S. Government, either in the navy or army; therefore, be it

Resolved, That the President of our Association appoint a committee consisting of one from each State of the Union, the duty of which committee shall be to procure in each State the support of their Senators and Congressmen, for the passage of an act giving the pharmacists of the army and navy the same rank and pay as now enjoyed by assistant-surgeons in these two branches of the service.

On motion of Mr. Hallberg this resolution was referred to the Association with the favorable recommendation of this Section.

The election of officers to serve during the coming year was then proceeded with, and on motion of Mr. Ebert, the Secretary was instructed to cast the ballot for Prof. Good, of St. Louis, as the next Chairman, and Prof. Hallberg as the next Secretary of the Section on Legislation and Education.

Prof. Patch and Mr. Sheppard were appointed to conduct the newly elected officers to the platform.

Prof. Good, having been introduced by the retiring Chairman, said :

" *Gentlemen :* In electing me for this position, perhaps as Dr. Eccles, has said, there is not quite enough difference in the Chairmen to make you believe that there has been a change, but I shall be more than pleased if I bring anything like the amount of ability to the execution of the duties of the office that he has brought. In referring to the few words dropped this evening, which certainly did not reflect my sentiments, I hope you are satisfied that in electing me to this position, you have not put a person here who is indifferent to pharmaceutical education. I trust that you have no such feeling. Now the work of this Section has come to be voluminous, and the Section asks for more time to be devoted to the general work of this Section. I hope that request will be granted. I invite papers and discussions on the subjects which are important, regardless of any preferences and prejudice that I might be supposed to have had in any special direction of pharmaceutical education; I say, I invite papers that shall embrace subjects under this heading, and I trust that latitude will be allowed in the treatment of them. With these remarks, and asking that I may have your hearty co-operation and assistance during the coming year, I promise you to devote my best energies to the success of this Section.

Prof. Hallberg, the newly elected Secretary, was then called for, and said :

Mr. Chairman and Gentlemen : I think I will have to congratulate the Association upon its choice (laughter); I know that it will be a great relief to many of you to have me placed in a position where I will have to confine myself to the work of the pen rather than to the work of the mouth, and I have no doubt that such motives actuated you in selecting me. (Applause).

On motion, the reading of the minutes was dispensed with.

The report of the committee on the Chairman's Address was then presented as follows :

Your committee having considered carefully the several points contained in the address, respectfully submit the following report:

First, The major portion of the address, comparing the older with the more modern methods of teaching, shows with great force the superiority of the laboratory methods of instruction over those which are purely didactic. This portion is believed by your committee to be founded upon sound educational principles, and to point out clearly the lines along which future progress in pharmaceutical education is to be obtained.

Second, The recommendation to urge upon Congress such a revision of the laws relating to patents, trade marks, and copyrights, as will more equitably subserve the interests of the public, is one of great practical importance, and in the opinion of your committee should have the careful attention of the Section on Commercial Interests,

W. F. SAWYER,
C. M. FORD,
J. H. BEAL.

On motion of Mr. Thompson, the report of the committee was received and adopted.

Mr. Mayo then moved a special vote of thanks to the retiring officers for the work done by them in this Section during the past year.

MR. FENNEL: I would like to make a few remarks on that subject, especially in regard to the address of the Chairman of this Section. Of course that address will appear in the Proceedings of the Association, but it embodies so much good advice that I think a reprint should be issued to all educational institutions in the United States. I therefore move that that be embodied in the resolutions.

This motion was seconded by several members.

The question being on the motion of Mr. Mayo as amended by Prof. Fennel, it was agreed to.

Dr. Eccles returned thanks to the members of the Association for this vote of thanks and the kindness manifested during the meetings, and in various other ways.

The newly elected officers announced that they had selected Prof. Beal, of Scio, O., as their associate, and the previous committee were requested to conduct the gentleman to the platform to be introduced to the assembly.

On motion of Prof. Patch, the Section then adjourned at 12:10 a. m.

IS SHOP EXPERIENCE NECESSARY?

BY OSCAR OLDBERG.

The query is: "Should students of pharmacy be required to give evidence of having had experience in a drug store before permitting them to graduate or register, regardless of the quantity or quality of knowledge possessed?"

In answering this query we will assume that by "drug store" is meant a properly conducted and reasonably well-equipped "apothecary's shop;" for experience in any other kind of a drug store has no value except from the purely mercantile standpoint.

But shop experience as a requisite for *graduation* is one thing, and the requirement of shop experience as one of the conditions of *registration* is another.

Pharmaceutical education in the broadest sense consists of two distinct parts: 1, systematic special courses of instruction in technical schools;

and 2, proper shop training. Both kinds of education are necessary to the complete development of such pharmacists as might in truth be called well-trained professional men. College courses in pharmacognosy, chemistry and pharmacy are as indispensable to the pharmacist as the medical college is to the physician ; yet the college of pharmacy alone can not impart to the student that practical familiarity with the requirements, exigencies and dangers of the daily routine of the apothecary's shop which comes from continued experience, any more than the medical college can turn out ready-made skilled physicians and surgeons. Neither can well-educated, accomplished pharmacists be produced by shop-training alone, any more than it would be practicable to have a respectable medical profession without the aid of good medical schools. That which a good pharmaceutical school does for its students can never be done for them by the shop, and that which good shop practice does for the apprentice and the clerk can never be done by any college.

The well-trained college graduate in pharmacy is prepared to see more clearly and act more intelligently, and, if he has had sufficient laboratory instruction, he can apply the tests prescribed by the Pharmacopœia. He finds that his fellow clerk, who has had several years of good shop experience, but never attended a college of pharmacy, cannot write or understand the simplest chemical equation, is unable to make any use of the simplest pharmacopœial tests, and betrays his ignorance upon many important matters having a direct bearing upon the work in which he is engaged. As a natural consequence the college graduate is very apt to over-estimate the relative importance of his college training, and to underrate the value of the training of the shop, especially if his own shop experience was insufficient or of poor quality.

Per contra, the shop-trained clerk might have had the good fortune to "learn the business" in a good store under a well qualified preceptor. If so, he observes that the college graduate without sufficient shop practice is perhaps unable to decipher some of the prescriptions which he himself can read at a glance. He sees that the college man does not make a more perfect pill or emulsion, or he may indeed discover that the college graduate is slow, awkward, lacks the workman-like readiness and skill, the confidence tempered by intelligent caution, in short the reliability, which is never attained except with actual participation for years in the daily routine of the shop. And thus the shop-trained man may be unable to recognize the value of a college course.

The college-trained man with insufficient shop-experience, and the shop-trained man without special college education, are both only half educated.

What we should have is both special pharmaceutical college training and sufficient shop experience. Then let the college and the shop mutually respect each other.

It should be kept clearly in mind that the college of pharmacy can neither furnish, nor regulate, nor verify, nor estimate the value of the shop experience of its students. Hence it should not undertake to vouch for it. Therefore the college of pharmacy should, in my judgment, have nothing to do with it. Not only is this enforcement of practical experience in drug stores wholly outside of the proper functions of any college, but the college has no effective or reliable means by which it may protect itself, the public, and its graduates, from the impositions which may be practiced, with or without fraudulent intent, in regard to the quantity or quality of the practical experience claimed by and for candidates for graduation. At the same time, there is a rational, systematic and reliable method of enforcing this necessary requirement of a complete pharmaceutical education, through the State Boards of Pharmacy.

The State Boards have the power to prescribe whatever rules they may deem necessary to the proper enforcement of the law, and can withhold the license or certificate of registration unless these rules are complied with. Then let us have an effective system and no half-way measures.

There should be a perfect system of registration by the State Boards of all apprentices and clerks in all drug stores, and no person should be credited with any period of apprenticeship except after such registration. Whenever a young man goes into a drug store, he should at once report his name to the State Board, together with proper evidence of sufficient preliminary education, and his employer should certify to the fact that the young man has actually entered upon a *bona fide* engagement in the store to learn the business. The apprentice should be required further to report any changes from one store to another, and such other precautions should be taken as would insure a complete and correct record of his whole period of "practical experience." The penalty for any false return should be a forfeiture of the credit for all or a part of the apprenticeship period, or of the right of registration, or the forfeiture of a license already issued, if fraud be discovered after the licensing. Any registered apprentice, registered assistant pharmacist, or registered pharmacist, whose name and record of active service may be found upon the books of the Board of Pharmacy, should continue in the enjoyment of his privileges as long as he observes the law, and should be liable to forfeit them if he wilfully violates it. That this system is practical we know from the fact that it is in actual use in several countries, among which are Ontario and Quebec, Canada, and Victoria and Queensland, Australia, where the conditions of the drug business are the same as in our own country.

SHOULD GRADUATES IN PHARMACY BE COMPELLED TO PASS THE EXAMINATIONS OF BOARDS OF PHARMACY BEFORE BEING REGISTERED?

BY HENRY R. SLACK, M. D., PH.M., LA GRANGE, GA.

In order to discuss this question intelligently, it is necessary to consider briefly the relations existing between the College and the Board, to the profession and the public.

The object of the true college is not revenue, but to educate the pharmacist, make him more proficient and useful, and dignify his calling by elevating it to a professional standing. Surely this is a high and noble aim, worthy of our best thought, but it is not identical with that of the Board. The preamble introducing the Georgia law sets it plainly forth, that the Board is created to protect the public against the indiscriminate sale of poisons and dispensing prescriptions by incompetent persons. The laws in other States are enacted for the same purpose. If they are not, then as a distinguished professor said in a paper read in New Orleans: "The sooner they are repealed the better; legislation for the benefit of classes is productive of much evil" (Prof. Remington, Recognition of College Diplomas by State Laws, 1891). I, however, take issue with the professor, on recognition of college diplomas as a license to practice pharmacy. I hold that it is to the interest of the public, the profession, and the college, for State laws not to recognize diplomas.

This opinion is not the result of prejudice; but mature consideration and seven years' experience and observation, as examiner on a State Board, has forced upon me this conclusion. My judgment differs from my preconceived notions, for when first appointed on the Board I strongly advocated recognition of diplomas; but "Times change and men often change with them." The causes that led to this change were these: Our law recognized both medical and pharmaceutical diplomas; to extirpate the one it was necessary to sacrifice the other. We hesitated for some time, but seeing the medical men outnumbered us nearly ten to one in the legislative halls, we yielded, and thus necessity compelled building better than we knew.

No one in this presence will claim that a medical diploma should confer on its holder the legal right to practice pharmacy, any more than he would hold to the right to practice medicine on a pharmaceutical diploma. Pennsylvania, the mother of pharmaceutical colleges, is, or was until recently, the only State to repudiate her own offspring and confer a pharmaceutical dignity on medicine refused to pharmacy herself. No wonder one of her brilliant professors waxed warm in his denunciation of "the legal degradation of a pharmacy diploma" by exempting the doctor and examining the pharmacist. In his condemnation of this injustice we heartily concur; but we hold that it is no degradation to the holder of a diploma to be given the privilege of showing, to intelligent judges, how much knowledge that diploma represents. This is a much more uncertain quantity than the friends of pharmaceutical education desire. The Juniors from some colleges not infrequently pass far better examinations than graduates of other institutions conferring the same degree. Here is the great advantage a thorough school enjoys in having its work passed upon by unprejudiced examiners, not connected with the institution.

Of course, we recommend to young men applying to us, not the school that is cheapest, nearest, or has the largest number of students, but the one that sends us the best prepared men. Thus an opportunity is afforded for us to distinguish between the teaching schools and the diploma mills—and how else could this be obtained except by a compulsory examination?

Another cause that has largely influenced me in forming my opinion is the present status of the medical profession in Georgia. Here a diploma from any chartered college, and a $10 professional tax, is a license to practice medicine; and what is the result? There are four medical colleges where one would be sufficient; and they have almost degenerated into diploma mills that vie with each other in grinding out the most graduates. These schools confer degrees on over 95 per cent. of the second-course men, and on practically all the third-course men. So great has become this evil, and the fact that Georgia is becoming the dumping ground for rejections from other States, and the Paradise for quacks, that the better element of the entire profession are now favoring a bill to create a board, similar to the Pharmacy Board, to review the work of the medical colleges, and to protect the public.

Four years ago, three of the medical colleges issued prospectuses for pharmaceutical adjuncts, and, with one additional instructor, lecturer or professor, were preparing to grind out Ph.G.'s, as well as M. D.'s; but, unfortunately for these conceptions, the pharmacy law was changed, so that no diploma is recognized, and only one has gone full term and been delivered of a class of Ph.G.'s. One of the colleges, finding she had miscarried with Ph.G.'s, is now bringing forth LL.B.'s.

Now, while we oppose registration on diploma, we heartily favor reciprocity among the State Boards, where the candidate has made 5 per cent. over the requirement to pass the examination. This may seem paradoxical or inconsistent, but that it is not can easily be proved.

1st. Any four or five men can secure a charter for a college and confer degrees, but no State has more than one Board, except New York, which is the proud possessor of four.*

2nd. There is greater uniformity in State examinations than in college, and less inducement to pass inefficient men.

3rd. Requiring 5 per cent. above the average to pass enables a Board to discriminate between those whom they think would be safer in other sections, and those whose horizon is as limited as the oyster's.

To sum up the foregoing briefly, not recognizing diplomas, is to the interest of the public, in that it protects them from incompetent men; to the college, by protecting them from diploma mills and making manifest their good work. It is plainly to the interest of the profession, because nothing lowers professional standards more rapidly than having a large number of poorly equipped colleges turning out ignorant men armed with a degree that carries with it license to practice that profession.

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* Texas practically has no pharmacy law.

SHOULD GRADUATES IN PHARMACY BE EXAMINED FOR REGISTRATION?

In answer to Query No. 10.

BY OSCAR OLDBERG.

Much may be said on both sides of this question. I have given it much thought, and have come to the conclusion that the true interests of pharmaceutical education will be best promoted by making no exceptions to the rule that all who apply to be registered as pharmacists or assistant pharmacists should be examined by the State Boards.

It is undoubtedly right and wise to give every candidate for registration due credit for whatever qualifications he may possess, and evidence of good education should most assuredly have great weight with the Board; but the evils that might result from compelling the State to register all graduates in pharmacy without examination are likely to be far greater than the advantages. The direct encouragement of pharmaceutical college training which attends the right of graduates in pharmacy to exemption from the State Board examination is unreal.

The powers of the State Board to test the qualifications of every candidate should not be curtailed. Lately there have been several attempts to amend pharmacy laws in such a manner as to compel Boards of Pharmacy to register as pharmacists, without examination, all candidates who may have been engaged in the drug business a certain number of years, or who may be graduates of medicine, and some of our pharmacy laws now in force do exempt graduates in medicine or pharmacy, or non-graduates who may have had several years "practical experience." Such exceptions or exemptions weaken the law and tend to defeat its objects, and are liable to work injustice and lead to abuses.

In determining the fitness of any candidate to be a registered pharmacist, it should be the duty as well as the right of the State Board to take cognizance of all germane evidence presented in support of the application for registration, and also to make independent investigations and tests of its own.

Good general education should count for much, and general ignorance should be fatal, without any regard to "practical experience," or any other circumstances.

Special college education in pharmacy should be counted for all that it is worth, and it is worth much if good. Thus, if four years' practical experience be required of non-graduates, the graduate should be allowed to count the time he devoted to his college course (not exceeding two years) as part of that four years.

Experience known to be especially instructive and valuable should be rated correspondingly higher than the same number of years of drug store experience known to be of doubtful value. Is it right or unavoidable to count one year's experience in a small store where one prescription a day is dispensed and scarcely any preparations made, as equal to a year in a large and busy establishment conducted in the most systematic manner and in which fifty prescriptions are dispensed daily, and pharmaceutical preparations made at all times?

Of two candidates having equal experience, and standing equally well in the examinations, the only difference between them being that one has a medical as well as a pharmaceutical education, while the other has no knowledge of medicine, it is self-evident that the candidate educated in medicine as well as pharmacy is the better pharmacist of the two.

A State Board of Pharmacy should not in any case be reduced to a mere perfunctory recording bureau, registering the decisions of medical and pharmaceutical colleges; but that is, of course, just what it is when it registers graduates of medicine or of pharmacy without examination. A State Board is a mere perfunctory recording office also in case it is obliged to register without examination every candidate who can prove that he has been employed a certain number of years in any kind of a place which by common usage is called a drug store, without reference to what he knows or does not know.

The fact that the graduates of the colleges of pharmacy have already passed searching examinations in botany, chemistry, pharmacognosy, and the principles of pharmacy at the colleges from which they graduated, does not constitute a sufficient reason for exemption from the State Board examination in these branches. Still less should it render them exempt from a practical examination into their ability to correctly interpret and dispense physicians' prescriptions and make extemporaneous preparations in a workman-like manner—an examination designed to ascertain, so far as may be practicable, the value and results of their shop training. Such a practical examination is the most important test to which the candidates for registration can be subjected, and no candidate should be exempt from it, no matter how many years of practical experience he may have had, whether a graduate or not.

Neither this nor any other kind of State Board examination is alone an infallible or sufficient test in all cases. In fact, all examinations are liable in many cases to lead to erroneous conclusions when their results are considered alone. Any experienced examiner will readily admit that an intelligent employer knows more certainly from daily observation about the knowledge and skill of an assistant who has been in his employ for some months, than he could ever find out by any examination continuing two or three days. It is further evident that competent and faithful teachers in colleges of pharmacy, having frequent opportunities to test the aptitude, general mental development, diligence, and progress of their students all through the courses of study, and to observe their relative success and habits of order, system, and neatness in the college laboratories, know more about their real maturity, knowledge and skill at the end of the college course than any examining board can possibly discover by examination.

That most external part of man's mind, the memory, is always in use, and, if well cultivated, this invaluable faculty may go far towards serving as a partial substitute for understanding. Mere matters of memory are too frequently mistaken for real knowledge, and in poorly conducted examinations, the nets used may catch no other fish. Inexperienced examiners may, however, be entirely satisfied if the candidate is able to answer a sufficient number of questions such as can be readily answered from memory alone. But such examinations are very incomplete. Practical individual examinations into the ability of the candidates to make prompt and correct use of their knowledge and skill in actual pharmaceutical operations are the most effective.

The best fruits of systematic college training are the discipline and development of the mental faculties and the resultant power to use them rightly and effectively. In the college courses, with the aid of competent teachers, the students take into the memory in an orderly manner the facts upon which their powers of observation, comparison, classification and reasoning are exercised, and they also learn to use their senses intelligently through systematic laboratory work, and are taught order and neatness. If they make use of their opportunities, they are developed in a direction where they certainly need it if they are to be professional or even only quasi-professional men, and this development is scarcely to be discovered by examinations nor afforded by shop training. In *many* cases the results of a practical examination are doubtless conclusive as to a candidate's *unfitness* for registration, even if considered alone; but the Board can arrive at a just conclusion in *every* case, whether the candidate be fit or unfit, only by taking into consideration all the important factors together: education in the schools, shop-training, and the results of the examinations. Let the maxim be fully recognized, "a place for everything, and everything in its place," and let the whole case go before the Board. No State Board examination can take the place of a college course nor of sufficient shop-training; no amount of shop-training can take the place of either the college course or the State examination; and no college course can take the place of either the State examination or the shop-training. All of these three requirements should be enforced, and the Boards of Pharmacy, of course, should enforce them.

The colleges and their graduates should be the very last to claim exemption from State examinations, and they should be the very first to uphold the authority of the pharmacy laws and the State Boards of Pharmacy. On the other hand, the State Boards should be the very first to encourage good pharmaceutical education, and the last to withhold from any graduate in Pharmacy the fullest recognition of the value of college training.

When the graduates of colleges of pharmacy are exempt from the State examinations on the ground that they have both special education and practical experience, and (in some cases), have already passed a "practical examination" in pharmaceutical operations, the function of the State's officers, charged with the duty of executing the laws to regulate the practice of Pharmacy, are not performed by them, but by private citizens and corporations, a condition of things which must be regarded as anomalous and inconsistent.

A DRAFT OF REGISTRATION REQUIREMENTS IN PHARMACY.

BY C. S. N. HALLBERG.

The first state pharmacy law was enacted for Rhode Island in 1871, and at about that time local laws were passed for Philadelphia, New York, and Baltimore. New Hampshire in 1875, South Carolina in 1876, Maine in 1877, and District of Columbia in 1878, enacted pharmacy laws. Not until 1880, however, did agitation for pharmacal legislation become general, along with the formation of state pharmaceutical associations, beginning with Iowa in 1880, Georgia, Illinois, Missouri, and North Carolina in 1881; in the other states as follows, chronologically arranged: 1882, West Virginia, Wisconsin; 1883, Delaware; 1884, New York, Ohio; 1885, Kansas, Michigan, Minnesota, Nebraska; 1886, Massachusetts, New Jersey, Pennsylvania, Virginia, Wyoming, Idaho; 1887, Alabama, Colorado; 1888, Connecticut, Kentucky, Louisiana, North Dakota; 1889. Florida, South Dakota, Texas; 1890, Oklahoma; 1891, Arkansas, California, Oregon; 1892, Mississippi, Tennessee, Washington; 1893, New Mexico, Utah.

At the present time there are only four states without pharmacy laws, viz.: Indiana, Montana, Nevada, Vermont; besides Arizona and Indian territories.

It is believed that every one of these laws was enacted upon the theory that "poor law is better than no law," that a beginning should be made, and that these laws could be improved in the future. Yet with thirty of these laws in force from 7 to 19 years what attempt has been made to improve them? While these laws fairly met the conditions at the time they were enacted, they have during these years developed other conditions which of themselves require a remedy. These laws, stated briefly, have raised the geneaal standard of pharmacal qualification, and through this have been of great service to the public. But they have also prevented the elevation of the standard of education, experience, and professional skill, by placing upon the same level the tyro with a scant two years' peripatetic experience, successful in passing the board of pharmacy examination, with the thoroughly experienced and educated pharmacist.

It is deemed unnecessary to dilate upon this feature, as it is apparent to every thinking pharmacist; but, since we assume that the pharmacist does not favor sacrificing himself for the benefit of the public to the point where he will have nothing further to sacrifice, the consideration of a remedy is of paramount importance. While the public has been protected against incompetent dispensing, and the physician-prescriber has been assured a fair degree of service, no one will deny that there still is plenty of room for improvement in either direction. The changed methods in treating disease suggest superior skill and knowledge of the pharmacist. The present standards of requirements for pharmacal practice should be raised. They may be adequate for minor service, but not for the full responsibilities of conducting a pharmacy. Another class should be created, which alone should have the privilege of supervising a pharmacy.

To render such plan practicable it would be desirable to classify the establishments in which drugs are sold into "drug stores" and "official pharmacies"—"drug stores" without the privileges of the sale of poisons and dispensing of prescriptions; "pharmacies" in which the art is practiced in all its details.

Based upon these considerations we present a rough draft for the requirements of the following four graded classes:

(1) *Registered Apprentice.*—Every person desiring to learn pharmacy, in order to be eligible to the examinations for the higher grades, must be not less than 15 years of age and shall file with the Secretary of the Board of Pharmacy a certificate of graduation from a high school or such other educational institution as the Board of Pharmacy may deem of equal or of sufficient standing in the common school branches, within six months after having entered into the employ of a pharmacist. Upon change of employer, and also upon cessation of work in a pharmacy for a period exceeding thirty days, the Secretary of the Board of Pharmacy must be notified accordingly.

(2) *Registered Assistant.*—Any Registered Apprentice, after the expiration of three (3) years of service in a pharmacy or pharmacies, such period of service counting from the time of registration as apprentice, shall be eligible for examination by the Board of Pharmacy. Said examination shall comprise:

Botany.—The rudiments of botany.

Materia Medica.—The official, botanical, common names and synonyms, natural orders, brief description, identification, uses and doses of five common official drugs.

Chemistry.—The principles of chemical philosophy. The names, symbols, sources and preparations of five elements, with the chemical formula of one compound of each element.

Pharmacy.—An account of the different systems of weights and measures, giving the denominations of each. Definition of the pharmacal operations involving the employment of heat. Definition of the various operations involved in the processes of solution and extraction.

Upon passing a satisfactory examination in the branches outlined, and having a record of three years' service as an apprentice, attested by the Secretary of the Board of Pharmacy, such person shall be registered as an Assistant, provided that such three years' service shall not extend over a period of more than five (5) years.

A Registered Assistant shall have the right to prepare, compound and dispense all drugs and medicines, except poisons and prescriptions, under the supervision of a Registered Pharmacist, or a Pharmaceutical Chemist, but shall not have the right to sell or dispense any drugs or chemicals in the absence of either.

(3) *Registered Pharmacist.*—Any Registered Assistant after two (2) years' experience in a pharmacy shall be eligible for examination by the Board of Pharmacy. Provided that the time covered by attendance at a college or school of pharmacy may be included in the period of the two years' sevice.

The examination shall comprise:

Botany.—A brief description of the organs of vegetation.

Materia Medica.—Identification of ten specimens of crude drugs, with their common names and synonyms; a written description of their natural orders, their constituents, medicinal and pharmacal properties, uses and doses. Also their official preparations, strengths and doses.

Chemistry.—Describing by equations how ten official inorganic salts are made; their reactions, tests, solubilities, medicinal and pharmacal properties, uses and doses. Enumeration of and distinction between the *ous* and *ic* compounds of one metal, a description of their medicinal and pharmacal properties, uses and doses, with the strength of their official preparations and antidotes if poisonous.

Pharmacy.—Distinctive description of ten of the principal official classes of pharmaceutical liquid preparations, with one preparation of each class; its method of making, strength, uses and doses. Interpretation and dispensing of five prescriptions, embracing solutions, emulsions, powders, pills, ointments or suppositories.

A Registered Pharmacist shall have the right to supervise the work done by a Registered Apprentice and by a Registered Assistant Pharmacist, to assume charge of an Official Pharmacy in the absence of the Registered Pharmaceutical Chemist, such absence not to exceed one week at a time, and provided such absence shall not exceed one month's time during any one year. He shall have the right to open, conduct, manage, and take charge of a drug store, in which drugs and medicines, not poisonous nor physicians' prescriptions, are made and sold, provided that such drug store during his absence, not to exceed one week's time, must be left in charge of a Registered Assistant.

(4) *Registered Pharmaceutical Chemist.*—Any registered pharmacist with three years' active service in a pharmacy or pharmacies shall be eligible for examination by the Board of Pharmacy; provided that not more

that one-half of this time (one and one-half years) devoted to study in a college, school or other institution teaching pharmacal subjects, may be included in the total period of service. The examination shall comprise:

Botany and Microscopy.—Vegetable histology, brief description of the cell and tissue system; recognition of five drugs on mounted sections; vegetable physiology; the principal groups of plants, description of five natural orders.

Materia Medica.—Identification and brief description of ten specimens of natural plant exudations and animal secretions, their derivation, constituents, pharmacal and medicinal properties, uses, doses and preparations with their strength.

Chemistry.—Organic chemistry, brief description of elementary analysis, constitution, decomposition, classification with one example of each of the ten classes; their derivation, chemical and pharmacal properties and preparations, uses and doses. Examination and identification by reagents of solutions of five official chemicals. Analysis of one unknown mixture of inorganic salts.

Pharmacy.—The formulas of ten compound official pharmacautical preparations, common names, synonyms and doses. Description of five organic substances including alkaloids and glucosides and their salts, derivation, preparation, chemical and pharmacal properties, solubilities, medicinal uses, doses, and antidotes in cases of poisoning; identification of two alkaloidal salts by reagents; interpretation and discussion of twenty-five prescriptions.

A Registered Pharmaceutical Chemist shall have the exclusive right to exhibit the title "Registered Pharmaceutical Chemist;" he shall have also the exclusive right to supervise and manage and take charge of an Official Pharmacy, to open and own on his own account or for any other person. The Registered Pharmaceutical Chemist is responsible to the Board of Pharmacy for the annual registration with the Board of Pharmacy of the title, firm, or name or ownership of the Official Pharmacy he has charge of, and of the Registered Pharmacist, Registered Assistant Pharmacist, and Registered Apprentice that may be employed in such Official Pharmacy, together with his own registration. He must also file with the Secretary of the Board of Pharmacy any change in name or ownership of such Official Pharmacy, together with the names of every person employed in such Official Pharmacy as Apprentice, Assistant, or Registered Pharmacist, within thirty days of such change in name, ownership, or engagement. Upon failure of said registration the Board of Pharmacy shall have the right to revoke the certificate of such Registered Pharmaceutical Chemist and issue a certificate to him of Registered Pharmacist, this to be exchanged in one year for the certificate of Registered Pharmaceutical Chemist in the absence of any further violation.

To every Official Pharmacy shall be issued a license by the Board of

Pharmacy, such license to be reissued annually, provided that such license may be revoked by said Board for failure to have a Registered Pharmaceutical Chemist in charge, or for violation of the ordinances in force for regulating the sale of intoxicating liquors.

THE APPRENTICESHIP SYSTEM.

BY EDWARD KREMERS, UNIVERSITY OF WISCONSIN.

The national and quasi-international Pharmaceutical meetings held last year at Chicago shortly after adjournment, bore one of their first fruits: a petty war over a set of resolutions. If we are to judge last summer's conference by some of the fruits borne thus far, we must come to the conclusion that there was something rotten at the very core. Much good will have to be accomplished to counterbalance the disgraceful exhibit before the pharmaceutical world, which we have witnessed during the past year. Mr. Martin overlooked a few things when he thought that the British pharmacist could learn nothing in America. If American hospitality had not blinded his eyes somewhat, he might have learned a lesson or two on champagne and a few more in the use of vulgar language.

Unfortunately this petty war is not merely a side-show to the Chicago exhibition—I do not mean the World's Fair, but one of its accessories—it has assumed larger dimensions. The few papers presented last summer at Chicago have been printed and reprinted ten and twenty times, the stock of the average pharmaceutical journal and drug-house monthly has been pretty well exhausted—naturally with the exception of the subjects of price cutting, liquor legislation and methods of advertisement, topics that are with us at all times--so that the charlatans in pharmaceutical journalism greedily seek every opportunity to fill their columns. A fight is always an interesting spectacle to the large crowd, and since there are no cast-iron rules regulating a war with the pen, the lookers-on can become participants as well. In fact, participation promises to become fairly general. It may, therefore, not be out of place and time to call halt, and to ask for a bit of reflection and sober judgment on a subject that is really an important one, It is the object of the writer of these lines to discuss, unbiased and from an historical, critical and educational standpoint, a subject that has recently been dragged through the mud of politics and hatred. No further reference will be made to parties who have taken part in these discussions; the writer will try to forget, for the time being, the language used and the intriguing arguments brought forth on various occasions.

The apprenticeship system is an institution of considerable interest to the historical and economical student. In order to understand its present, it will be necessary for us to study its past. Furthermore, it will not suffice to study merely the history of the pharmaceutical apprentice, but as we shall shortly see, it is necessary to a better understanding of the subject to study the development of the apprenticeship system of the trades in general.* The term trade is used by political economists with different shades of meaning. According to the most common usage, the labor of trades is always material labor, and consists in the working of materials for the production of new or the improvement of already existing materials. In a broader sense the term implies each and every professional activity inasmuch as its aim is acquisition or gain. Thus the occupations of the farmer, the merchant, the printer, the saloon-keeper, and even the learned occupations of the writer, the physician, the teacher, are included in this term.

The history of the trades and the laws governing the same, varies with the large number of nations that have risen to the level of a trading and manufacturing people.

Society among the Greeks and Romans since the fifth and second centuries B. C. respectively, was divided into three distinct classes :

1. The oligarchy in possession of land and capital.
2. The proletariat of the smaller citizens.
3. The slaves.

Manual technique in some of its branches had obtained a high order of artistic perfection, but the trades as a whole, in spite of the perfect freedom of industry, never obtained a prominent position in ancient political economy. The body of tradesmen, with the exception of the artist, never attained the position of a respected and economically well situated society, To earn money through manual labor was considered as something dishonorable, and the body of citizens consented to it, but unwillingly. Production was largely the work of the slaves, and on account of the peculiar formation of the ancient household, this production was only to a small extent for the market. Under such conditions there was no development of the trades possible among the middle classes as in more modern nations, and for this reason European nations, that received their civilization largely from Greece and Rome, could be influenced but to a very slight degree so far as the development of the trades was concerned.

A study of the history of the trades of various European nations, that contributed largely to the settlement of America and to the development of our trades institutions, would lead too far for the scope of this paper. Since comparisons are to be drawn later in this paper between the conditions of pharmacy as existing at present in Germany and in this country, also since the rise and fall of trade corporations has been thoroughly studied in that country, I shall restrict myself to trace very briefly the development of the trades in Germany. Inasmuch as a large percentage of the better class of trades-laborers of this country at present consists of Germans, this selection may be further justified. Furthermore, inasmuch as in other of the principal nations of Europe trades have undergone a similar development, the study of the development of the trades in one of these countries may suffice to throw light on the development of the same in all of these.

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* Schönberg, Handbuch d. P. Oekonomie, Bd. 2, p. 419, etc.

The history of the development of the trades in Germany is characterized by five distinctive periods:

1 The oldest time until the formation of cities.

2 From the 12th to the close of the 16th centuries. (Development and prime of corporations.)

3 From the close of the 16th to the beginning of the 19th centuries. (Decay of the corporations and regulation of the trades by police rules.)

4. The 19th century until the establishment of the German empire. (The breaking through of industrial freedom.)

5. Since 1871.

FIRST PERIOD.

The oldest time until the formation of cities.

During this period of over 1000 years the Germans were on the economical plane of a purely farming people. Previous to the migration of nations, trade labor, with possibly the exception of the work of the founder and smith, was not an independent sphere of trade activity. Technical productions were made either by members of the family or by servants of the household. Technical production was very simple and primitive. On the western and southern boundaries, Roman influence possibly began to exert itself in pottery and weaving as it did in the working of metals. The smith who prepared metallic utensils for the house and field, the weapons for the hunt and war, was the only tradesman. It is not to be supposed that his trade was regulated in any way.

Independent trade occupation in other branches came into existence only after the migration of nations, and particularly after the rise of feudal lords, on the manors of such lords. In the courts of kings and of other worldly as well as spiritual rulers, trades began to develop and to branch in various directions. Handiwork, however, was no free occupation for gain in these courts. The tradesmen were bondsmen, and worked like other servants for their lord and his family. He in turn cared for their wants, food, shelter, clothing, etc. The greater the number of persons united on one manor for mutual protection and benefit, the greater the advantage of specialization of labor. Smiths, shoemakers, tailors, gold and silver smiths, cooks, bakers, millers, carpenters, and many other trades, are mentioned in the "Volksrecht" of this period

In the course of time great improvements in technique are made: foreign artisans appear upon the scene; the technique of antiquity becomes known and is imitated; the courts of kings, the seats of bishops, the monasteries, become centres of skilled technical labor, and from these centres the entire country becomes permeated with technical progress. The majority of laborers at the trades are still bondsmen, the officers or the servants of the king or lords of manors. In the royal courts they are first organized into guilds. The members of each organization are divided into masters, assistants and apprentices. They are under the control of officers set over them, or in last instance of the lord of the manor who appoints such officers or judges. The laborer has no right to a particular kind of work, but can be ordered here or there according to the will of his master. For this work he receives a remuneration, and it is only by special favor that he may work for a third party.

SECOND PERIOD.

From the 12th Century to the Close of the 16th Century.

In those cities which had grown out of manors, the trades had been strengthened by an influx of foreign tradesmen. The "Stadtherren" (city lords) favored this addition to their communities because it strengthened the same and increased their influence. The new tradesmen became free, either immediately or after a short period. In the course of time those also who had been bondsmen became free either entirely or in large part. In newly founded cities created by the acquisition of the right of market by farming communities, the trades were free from the beginning.

At first there were no special laws regulating the trades as a whole. For the safety of the public, however, some of the trades, such as butchers, bakers, weavers, brewers, etc., were placed under police regulations. The "Stadtherren" tried to foster the trades, without, however, forgetting their own interests. On the whole, this patriarchal-regalistic leadership seems to have been imbued with a liberal policy. It may be characterized as a liberal system of concessions. Specific limitation of the trades as found later in the "Zunftrecht," there was none. The tradesmen were laborers with simple tools, their business was conducted on a small scale. They worked largely, if not exclusively, for the city and the immediately surrounding country.

In connection with this growth of the trades there is found hand in hand the development of free corporated societies. This movement had its forerunner in the "Schutzgilden." Following the example of the merchants, innkeepers, and others, the tradesmen of the same or of similar trades now come together, forming societies to foster their common interests: economical, social and political. In such cities in which trade-guilds had been established by former lords, their character was modified in the course of time by the addition of free tradesmen. The united tradesmen demand larger political rights for their members, participation in the government of cities, independent regulation of their trade interests, and an independent judiciary. This movement grows with the increased power of the trade corporations in the cities. The "Stadtherren," whose authority thereby becomes limited, oppose the movement; under Frederick II. they appeal for imperial help; the emperor prohibits all trade societies—but neither emperor nor city masters have the power to check this movement, and to stop it in its victorious development. The movement ends in the "Zunftwesen und Zunftrecht," the rights of corporations, as it is found here and there in the 13th, more universally in the 14th and 15th centuries.

To describe but briefly the character of these trade corporations would lead too far. Suffice it to state that they occupied a peculiar position of a two-fold nature. On the one hand they were free and independent corporations of companions (Genossen), which looked after the interests and the welfare of their members. As such they had private and public rights towards themselves and others. The only limitation in the exercise of these rights consisted in the obligation that their actions be not hostile to the interests of the city. On the other hand, they were organs of the city, of the city government; societies for the advancement of public welfare. Their rights were accompanied by corresponding duties: the positive duties of caring for the interests of the consumer, of maintaining the honor of the trade, of fostering the general welfare of the city. It may be well to add that during the prime of the trade corporations these duties occupied the foreground. This two-fold position of the corporation stamps its character with a mixture of dependency and freedom. The measure of the latter varied in the course of time, and for different places, but nowhere is complete autonomy to be found.

The organization of the corporation comprises masters, assistants and apprentices. The masters are the "Vollgenossen," the assistants and apprentices the "Schutzgenossen" of the corporations. Not only with regard to economical matters, but also with regard to quarrels among themselves or with their masters, or as to offences against customers or the honor of the trade, they are placed under the jurisdiction of the corporations. Like the apprentice, the assistants, as a rule, belong to the household of the master. All are free persons. The assistants, however, do not constitute a separate branch of laborers, organized as such; they were wholly intermediate persons, who had learned their trade, but had not yet acquired the right of master.

The right of independent practice of the trade ("die Meisterschaft") was, as a rule, made dependent upon membership in the corporation. This compulsion of membership was either vested solely with the corporation, or in some cases was left in last instance to the city government. The mastership by corporation was furthermore dependent upon the moral and technical qualification of the applicant. At first, the manner in which the technical skill was to be acquired was not regulated by law. From the nature of the case, however, the only practically possible manner—service for a given period as apprentice and later as assistant with a master—gradually became the legally prescribed one. Still later a definite course of instruction for apprentice and assistant was demanded; a specified period as apprentice and as assistant, the duty of the assistant to travel, and with some corporations a so-called "Probe-" or "Muthzeit." A special form of proof of qualification was not demanded at first. Here and there in the second half of the 14th century, more generally in the 15th century (but not universally) the official test for qualification as master consisted in the working out and presentation of a masterpiece.

The corporation did not refuse admission to the qualified. The applicant, however, had to be a citizen, and in the second half of the 15th century many corporations demanded a certain fortune, for which, however, bond could be given. To discuss the reasons for these demands or to merely point out other characteristics of the corporations during their prime would lead too far. In closing this brief sketch of the history of this period, it may be well to add that the organization and laws of these corporations greatly limited the individual in his liberty. They prevented him from becoming wealthy, they checked the development of industry on a large scale. On the other hand, they secured an independent economical existence for all, and for the tradesmen as a class prosperity, honor, respectability and political influence. Particularly in the limitations of the individual and in the control of the education of apprentices and assistants the corporations of this period impressed their stamp upon the trades, which caused them to be considered an art; artisans everywhere showed a dexterity and skill, which has never again been attained. In this manner the corporations became an essential cause of the prime of German city activity, which is one of the happiest and brightest phenomena of German history.

In the course of time, however, the character and importance of the corporations completely changed. A new period follows, that of the decay of the corporations: a paternal regulation of the trades by the state and a mercantile trades policy.

THIRD PERIOD.

From the Close of the 16th Century to the 19th Century.

Signs of decay became apparent in the 15th and 16th centuries in those cities in which the corporations were not prevented in the abuse of their rights and power by the city authorities. The decay, however, became more general toward the close of the 16th, and in the 17th centuries. This phenomenon accompanied changes in general political, economical and judicial conditions. Petty states had been formed in which state autonomy, absolutism of the rulers, governmental paternalism, inequality before law, favoritism of certain classes, political and commercial exclusion toward other states, developed more and more. The discovery of a waterway to the Indies, thereby depriving the South German states of their lucrative carrying trade in Indian products; the decay of the Hanseatic Union, cutting off the Scandinavian market from North Germany; the thirty years' war, accompanied by the devastation of German cities and farms and a decimation of the people, completely changed the former conditions of prosperity.

The old corporations remained, but they served a different purpose; they were utilized in another spirit, they possessed a different character. The duties of the corporation, formerly broadly interpreted, were pushed into the back-ground; the corporation became the source of a secure revenue to a few privileged families. The older fraternal virtues degenerated into the corresponding faults: public-spirit into a corps-spirit; the endeavor after power, honor and respectability into eagerness after gain; the old pride of trade into petty vanity; love of honor into spread-eagle selfishness; piety for custom into desire for empty ceremony; the debarring of the unworthy into ungenerous exclusion; the sense of fraternalism and equality into fear of competition and envy of trade; the living sense of public life into the particularism of a corporation that boasts of its monopoly.

The right of master became an article of commerce and was given to the highest bidder. Favoritism was shown to sons and relatives of masters This limitation of masters was accompanied with an increase of assistants who stood no show of ever acquiring the right of master, and thus this class deteriorated. In the same manner the training of the apprentice was neglected. The stimulus of free competition being removed, the quality of the work became poorer, and with it *the educational value of the work as apprentice and assistant deteriorated.*

The abuses became greater and greater, and with their growth complaints became more numerous. After several vain attempts on the part of imperial diets in the 16th and 17th centuries, reform in a number of states was at last carried in part in the 18th century. (Reichstagsbeschluss von 1731.)

The corporation laws were still continued as private judicial privileges, but as being granted by the state and which could be recalled. The state, no longer the corporation, was considered the source of the right of trade. Not only the corporation, the state also could appoint masters. The corporation became an institution placed under police control of the state. A very complicated code, regulating all the details of the trades, was issued. The trades were classed into corporated and into non-corporated. The latter comprised the newly developed industries of the factories, which had grown out of the earlier "Hausindustrie." The latter is even to-day co-existent with the former in many parts of Germany.

The corporated trades remained externally much as before. The apprenticeship was retained and regulated in detail ("Annahme, Behandlung, Ausbildung, Lossprechung, Contractbruch der Lehrlinge"). The assistants were controlled in a similar manner by police rules. The masters were also held in check. The ruler could at pleasure dispense any person from complying with the rules and regulations of the corporation: could force the corporation to accept an undesirable member, could prohibit the same from accepting a desirable one, etc.

This paternalism and police regulation of the trades did away with some of the evils that had arisen, and in some states accomplished good in stimulating the new industries of factories. Individuality, however, was lost. The rights of the individual were often injured. As a result, the deeper scientific study of the laws regulating the trades, on the part of Adam Smith, and the school after his name, began to wield a powerful influence, and led to the ultimate adoption of freedom of the trades: in some European states with revolutionary rapidity, in others through a more gradual process of development.

In France (législation industrielle de 1789–1791) the revolution had brought industrial freedom. The corporations and guilds, all privileges and limitations of the trades, were abolished. The right of trade was conceded to all persons in good standing before the law, the practice of a trade being made dependent solely upon the procurement of a trade-certificate upon which a trade-tax was placed.

FOURTH AND FIFTH PERIODS.

The 19th Century.

After the unfortunate war of 1806 and 1807, and after the peace of Tilsit, in which Prussia was reduced by one-half in her territory, the Prussian ministers Stein and Hardenberg recognized as their first duty in the restoration of the state the necessity of raising the economical condition of the people by a removal of the "Unfreiheiten und Bevormundungen auf allen Gebieten."

To study these changes during a prolonged period of political and economical unrest, when Germany was merely a geographical conception, may be of interest to the historical student, but even a mere outline would here be out of place. Like Prussia, the other German states drifted toward industrial freedom, and since the German empire was re-established the trade laws of the same are also based on industrial freedom. Any and every person of good standing before the law can carry on a trade—with the exception of the apothecaries' trade, that of minting, and a few others—if he but notify the municipal authorities of his intention. That there are limitations in the form of police and state regulations concerning the quality of food-stuffs and beverages, the manufacture of combustibles, the formation of corporations, etc., need only be mentioned. That which interests us more is the present attitude of the trades and of the state toward the apprentice, his education and training.

The fitness which is necessary for the performance of the various manual accomplishments, demands special education and training. The highly developed division of labor and the application of machines, it is true, has very largely simplified manual labor to such an extent that the requisite skill can be acquired in relatively short time. Nevertheless, there are many trades in which special training is a necessity in order to accomplish good results. The amount of education and training varies largely with the different trades. The problem is to make this desirable amount obligatory with all trades. This cannot be accomplished without legislation, but the success will depend even more largely upon the attitude of those classes of society from whom the various trades must largely draw. Only with sufficient education and specific training will the trades be able to accomplish the very best.

To satisfy this demand the German cities, provinces and states respectively maintain several grades of schools:

1. "Gewerbliche Hochschulen" (Polytechnicums and Building Academies): Berlin,* Karlsruhe, 1825, München, 1827, Dresden, 1828, Hannover, 1831, Stuttgart, 1832, Braunschweig, 1862, Darmstadt, 1869, Aachen, 1870. These correspond largely to our polytechnicums and colleges of engineering.

2. "Gewerbliche Mittelschulen," technical schools, approximately of the grade of our high schools in general educational value, with manual training preparatory to the practice of a trade.

3. "Gewerbliche Fortbildungsschulen," corresponding to our evening schools and colleges, giving those who have had but a common school education, and who are actively engaged in the practical pursuits of life during the day-time, an opportunity to improve their limited mental acquirements, thus insuring a somewhat better capacity for the demands of practical every-day life.

4. "Kunstgewerbeschulen."

5. "Kunstacademien."

The manner in which the relation between apprentice and preceptor is at present regulated and the manner in which, according to economists, this relation could be improved by legislative enactments; the duties of the one toward the other, etc., need not be discussed here. It may be well, however, to add that the opinion is growing *that a course of instruction and practical training should be made obligatory on the part of the apprentice, and that this instruction and training should be given in schools rather than in the shops.* The advantages of such a course are as follows:

1. The apprentice is apprentice and nothing more, and the sole object of his occupation is a sufficient education and training.

2. The course of his education is systematic and graded as it cannot be in the ordinary shop.

3. In it there lies the guaranty of thorough training-masters, and that the education of the apprentice is carefully superintended.

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* "Bauacademie," 1799, "Technisches Institut," 1821, "Gewerbeinstitut," 1827, "Gewerbeacademie," 1866, the two united to "Technische Hochschule," in 1879.

4. With the practical training there can be combined the necessary theoretical and technical instruction.

It is true that under such excellent instructional conditions the apprentice will learn little of the mercantile side of his trade, of his relations to customers and accommodations to certain conditions, etc. This deficiency, however, can easily be remedied by a time of probation, whereas the technical education of the apprentice is so greatly neglected in the ordinary workshop that it seldom can be made good. Of the schools of the second class mentioned above, giving systematic courses in place of the ordinary apprenticeship, there were in Germany in 1886 about 180, in 107 localities, with an attendance of more than 5500 pupils.

The brief sketch, to which knowledge of general history will have to give color, in order to produce a comprehensive picture, may by some be considered a lengthly introduction, yet it was necessary if the end in mind was to be attained. To have merely stated that the apprenticeship system originated during a very primitive period of social and economical organization; that its institution was good because it supplied a natural demand and that its development for a time was healthy; in fact that for a long time it was the only education for the mechanical professions to be had; that as long as the qualifications regulating the apprentice, the assistant and the master workman were largely of an educational character, the results of this system were good for a comparatively primitive society, and that as the good characteristics of the corporations degenerated to correspondingly bad ones, the entire system degenerated and became positively bad—to merely make a few statements of this kind would not have sufficed. It was necessary to picture, or rather to sketch briefly and in outline, the entire history of the system from its conception to the present day. Only in the light of the past can we understand our present situation and obtain a view into the future.

The fact that the system has not been destroyed, that even in free England, under the doctrines of Smith, it survived merely, is another example of the tenacity with which old institutions and doctrines, that have once supplied a natural demand, adhere to fundamentally modified surroundings of life.

That they should be revived in a country that begins a practically new existence under primitive conditions is also natural. That in such a country, if it prospers rapidly, the system should rapidly outgrow its usefulness without having even gained a firm educational footing, is an equally natural consequence.

We have furthermore seen that in Germany, and this is equally true for other European countries and even our own, the apprenticeship of the shops is giving way to a so-called apprenticeship in the "Gewerbeschhulen;" that it is generally acknowledged that the pecuniary interests of the shops by no means permit of the best systematic training of the apprentice, but that this is to be sought under the guidance of master-workmen with instructional capacity and ability, in the training schools, in which the necessary theory can be taught before and side by side with the technical training, a condition practically impossible in the shop.

"Tempora mutantur," and those who do not change with the times must inevitably remain behind.

But what is the bearing of all this on the pharmaceutical apprenticeship?

The first apothecary shops in Germany were established in the 13th century, during the prime of the apprenticeship system. It was but natural that the only way to learn the "Apothekerkunst" was to serve as apprentice with an "Apotheker." Since pharmacy has always been considered, by some at least, as one of the learned trades or professions, it does not surprise us that the deficiencies of the apprenticeship system became apparent earlier than in the general trades. The sciences on which pharmacy is based, and in particular chemistry, made such rapid progress in the 18th century, that the average pharmacist soon found himself lagging behind. Those who noticed this short-coming, tried to check it at first by an improvement of technical literature. But this, it was soon observed, did not suffice. Neither the use of excellent works on pharmacy, nor the instruction accorded the majority of apprentices and assistants by their older colleagues, sufficed to give the pharmacist the absolutely necessary education and training. The recognition of these deficiencies led to the establishment of private institutes in connection with already existing pharmacies: that of J. B. Trommsdorff, in Erfurt, in 1795, and that of Schrader, in Berlin. It might have been very wholesome to a number of American pharmacists, who last year blew the trumpet of professional aggrandizement, to know that in a small town of Germany there was offered a century ago a course in pharmacy broader, more comprehensive and more thorough than the courses of some American colleges who announce that they are leading the world in pharmaceutical education, whereas their courses place them little if any above some of the "Fortbildungsanstalten," the lowest type of trade educational institutions of Germany. Whereas most of our large American colleges are beginning to make laboratory courses in the various sciences obligatory, and then oft-times courses that are a farce on education, the main stress in the instruction at Erfurt a hundred years ago was laid on laboratory work. Another lesson that most American pharmaceutical schools might learn from Erfurt, is that the number of students was limited to twenty. It was quality, not quantity, that these reformers of pharmacy were after. The unselfishness of this undertaking becomes even more apparent from the fact that when German universities offered instruction in pharmacy, which naturally was better than that given by a few men of a private institution could be, Trommsdorff, in 1829, after thirty-three years of useful activity, closed his school.

With the beginning of this century the "Schwerpunkt" of the pharmacist's scientific education was transferred to the university. Doebereiner, Rose, Liebig, Gmelin, Geiger, Buchner, Bunsen, Will, Fresenius, Gorup-Besanez, and others, many of whom knew, from practical experience in pharmacies, the needs of the pharmacist, gave special attention to pharmaceutical chemistry and to pharmacy in their lectures, and particularly attracted young pharmacists to their laboratories. A new era began to dawn, practical pharmacists were stimulated to greater scientific and literary activity. Organizations of assistants to foster their interest in the sciences were established, professional literature improved, because there were men who had something to write and others who were eager to read.

And yet German chemistry and botany, the cradles of which once stood in the pharmacies of the fatherland, have both outstripped their parent. There are at present few pharmaceutical professors at German universities, and the pharmaceutical student is not recognized as being on an equal plane with the other students. Why should this be?

Dr. Vulpius, of Heidelberg, while discussing pharmaceutical education in an article on pharmacy (Real-Encyclopædie d. gesammten Pharmacie, Bd. 8, p. 109) states, "*that the educational conditions of the pharmacist lie so peculiar, they differ from those of almost all professions that must seek a scientific education.* Everywhere else the theoretical knowledge, the peculiar scientific education, is sought exclusively in schools of some kind, be it at the university or at technical schools, whereas only the practical knowledge and skill is acquired under the supervision of an experienced colleague. How different with the pharmacist! From the very day on which he enters his apprenticeship, his professional activity presupposes a certain knowledge of the natural sciences, which he has not even had an opportunity to acquire. The preceptor, therefore, has the moral as well as the legal obligation not only to give instruction in practical pharmacy, but also theoretical instruction in the allied general sciences. After three years, when the apprentice appears for his assistant's examination, he is supposed to possess a liberal knowledge of botany, physics and chemistry. It will be *well nigh impossible* to maintain the obligation on the part of the preceptor to give this theoretical instruction, for not every competent pharmacist possesses the qualities of a teacher. The realm of the sciences also becomes wider and deeper, and although the commonly prescribed course may suffice to drill the apprentice in the pharmaceutical manipulations of the laboratory and even to give him some knowledge of pharmaceutical chemistry and pharmacognosy, for anything beyond that, time will force the apprentice to seek preceptors who are specially qualified as teachers and who can give special courses of instruction."

If such are the conditions of the apprenticeship in Germany where the profession of pharmacy is restricted to a few, who have had a much better general education than the average American pharmacist; who have spent three years with an *educated* pharmacist learning the rudiments of the art and science of pharmacy; who have traveled three years to broaden such knowledge; and who, finally, have taken a two years' course at a German university, what can be expected of the American apprentice, who often has not completed the elementary studies of the grammar grades; who, probably, has spent two to five years in a general store with prescription and patent medicine attachment, or in a bazaar or confectionary with similar appendix that it may be called a drug store, selling soda water or wall paper, paints and oils, cut flowers or bric-a-brac, who further may or *may not* have spent two or three evenings per week after a day's hard labor on the benches of a pharmaceutical amphitheater, possibly listening attentively to a lecture, possibly also availing himself of the opportunity to take a nap, possibly hissing because he understands not what the lecturer is talking about? What can be expected of apprentices with such experience, and what of instruction by graduates or non-graduates of the American drug store type?

There are, I am well aware and exceedingly happy to state, excellent exceptions to this rule. There are a few pharmacists, who give their apprentices an opportunity to study, although they themselves are not able to direct such studies. There are also a few able and willing; but the large mass is wholly incompetent, and it were better for the average apprentice to have spent several years on the farm or ranch. He might then come to a college in good physical condition, though he had meanwhile forgotten how to study. The average apprentice or clerk, however, has not only acquired bad habits mentally, but frequently is physically (not to mention morally) all the worse for his apprenticeship.

In order to remedy the shortcomings of pharmaceutical education in Germany the more earnest and enthusiastic pharmacists demand:

1. Better preliminary education and general culture, viz.: the "Maturitätszeugniss," the completion of the studies of the Gymnasium, which offers a course about equal to the one leading to the bachelor's degree in arts (B. A.) in our country.

2. A longer and broader university course leading to the doctor's degree in philosophy.

3. Many demand the establishment of pharmaceutical institutes at the universities, the clinics of the pharmacy students, in which the application of the general sciences can be systematically taught by competent men who possess a thorough knowledge of the practical needs of, and who are in sympathy with the pharmacist.

Germany at present leads the world in science: it leads the world not only in the pharmaceutical sciences, but also in the educational and social status of pharmacy as a profession. We might well strive to imitate her in what she *has* accomplished, but as the better elements of German pharmacy are radically dissatisfied with their present educational status, it will not do to follow blindly. Besides, we as Americans have to take into consideration educational, economic and legislative conditions peculiar to our country and form of government. To imitate might, therefore, be even foolish. Furthermore, the pace set by German pharmacists may be too rapid to make it possible for us to follow immediately. However, if we desire to maintain dignity of profession and to insure the respect of colleagues of other professions, the motto of the reformer of German pharmacy must become our motto, viz.: *the pharmacist must, as a professional man, be placed on the same level educationally and socially with the physician, the lawyer, the theologian, in fact, with any learned profession.* If we succeed in this we may not yet lead the world, but we shall have gained position and respect at home as well as abroad.

How such a change will effect the pharmaceutical apprenticeship we shall now ascertain. If the professions in America are generally of the opinion that an apprenticeship is the best road toward mastership in a profession, pharmacy may well cling to a system that has largely become antiquated in the most intelligent European nations, because the conditions surrounding us may differ from those in Europe, and because the system may possibly best meet our highest demands. If, on the other hand, the professions in America are laying aside more and more the apprenticeship system as being of little use or even detrimental, the pharmacist should reflect for a moment: he should not only review the traditions of the past, he should not restrict his study to his calling, but should make a critical, historical, as well as comparative study of the entire subject.

What then is the practice of the learned professions of this country? In an address before the graduating class of the Cooper Medical College in December, 1892 (Abstr. Pharm. Rundschau, 1893, p. 86), President Jordan, of Leland Stanford Jr. University, quotes the humiliating statement that "in America we have but one learned profession: that of engineering." As a reason for this state of affairs he gives the following explanation: "Empiricism may do for the lawyer, the preacher, the teacher, the physician, the pharmacist; it will not do for the engineer. Man may trifle with material, mental, bodily or spiritual interests, and no one may ever know it. The complexity of the conditions insures escape. But no one can fool with the forces of nature. For the law which brings the untrained engineer to failure is inexorable, and its operation cannot be hidden. The failure of an untrained man in any other profession may be just as certain, but it is not so sure that the world will find him out."

The generally recognized fact that empiricism will not do for the engineer, has made it possible for colleges of engineering to maintain a higher educational standard than other professional schools. The colleges of engineering demand graduation from accredited high schools or academies for admission and offer scientific courses of four years. They not only *do not* ask for an apprenticeship served with some engineer, but recommend rather a review of high-school algebra during the last year or during vacation as a better preparation for freshman mathematics at college. The colleges in their courses lay stress on general principles. The motto of the college of engineering of the University of Wisconsin printed on the special announcement (1892), read as follows: "The aim of the College is not to produce engineers, but to produce men with great capacity for becoming engineers."

Fully in harmony with this motto is the belief of one of the most successful electrical engineers of the age. In his presidential address before the English Institution of Electrical Engineers, Mr. Alexander Siemens concluded his remarks by saying "that it is highly desirable that the teaching of engineering colleges should be confined to general principles as far as the applications of science are concerned, and that the student should become thoroughly well acquainted with the mental tools that are used in scientific investigations, *and be trained afterward in practical work*, when he has time to select what special branch of the profession he wishes to devote his life to." (*The Electrical World*, vol. 23, p. 202.)

Those who preach the like in our profession are decried as heretics by the orthodox pharmacist, who has learned his "trade" by serving an apprenticeship, whose father, grandfather and great-grandfather have gone through the same process. This educational method applied to the engineer in former generations as well as to the pharmacist. With the advent of good engineering schools the "raison d'être" for apprentices in engineering has ceased. Apprentices in engineering still exist, and, no doubt, will continue to exist for many years to come, but they do not become professional engineers, they furnish the rank and file of the mechanic artisans. The difference between the two callings at present is, that, whereas the pharmacist still swears by the educational doctrines of his forefathers, the engineer has advanced and has gained for himself the enviable reputation of constituting the only learned profession in this country.

The average American doctor, like his confrère, the druggist, gets into the ranks of his profession by serving several years as apprentice with some physician. The result is a low status of the profession as a whole. In Germany *e. g.*, where the standard of medical education is high, the student, after having completed the humanistic studies of the Gymnasium, immediately enters the university upon a four to five years' course. After the completion of this course he spends a year, or even two or three years, in a clinic or in the office of a physician with a general practice. He gets his full share of theory first and without interruption, then he acquires practical knowledge with an older colleague. What deplorable results our system, or rather lack of system, of medical education has produced, I need but allude to. President Jordan, himself an M. D., in his address already alluded to, makes a scathing attack upon medical schools. As a remedy, he suggests practically the course pursued in Germany, with such slight modifications as our educational system demands. In offering an abstract of the address to the readers of the "Pharmaceutische Rundschau, its editor, Dr. Hoffmann, very cogently remarks that the main points of this address apply equally well to pharmaceutical education and to the colleges of this country.

Whereas both professions have a low general standard in common, it must be conceded that the medical profession has a larger number of men that give tone to its ranks than the pharmaceutical profession. Statistics show that out of twelve physicians in this country one has a general college education, *i. e.*, an academic degree. So much or so little cannot be said for pharmacists. Most medical schools, although they like the large pharmaceutical colleges practically throw their doors open to all comers, seek the academic graduate and offer him inducements, whereas one of our "great lights" in pharmacy has not many years ago mocked at the attainments of the bachelor as a preparation for pharmaceutical studies (*A. J. P.*, 1885, p. 8.). The American Academy of Medicine has adopted the bachelor's degree or its equivalent as the standard of admission to membership. An academy of pharmacy on this basis would be a practical impossibility on account of the lack of a sufficient number of possible members. Furthermore, the John Hopkins University Medical School by demanding the bachelor's degree for admission has demonstrated the possibility of existence of a medical school of high standard. A pharmaceutical school of such standard is a practical impossibility at present. It is true, medicine has had many advantages over pharmacy. Medical schools were established a century or more before pharmaceutical schools were thought of. Medical schools for a long period have been connected with large universities and have had the stimulus of contact with large scientific bodies, whereas the connection of schools of pharmacy with large universities is but of recent date. More than one lesson could, no doubt, be learned by pharmacists from recent advancements made in medical education, but the one to be pointed out in this paper is that with these advancements the apprentice more and more drops out of the system. Broad culture courses as preparation, immediately followed by strictly medical studies *and not* interrupted by a service as apprentice, is the course that has been followed in Germany and other European countries, and which American physicians and schools of medicine are now beginning to follow.

Many a lawyer of to-day has never seen the inside of a college building, and the status of law as a profession is humiliatingly low in this country. On the other hand, the applicant who desires to enter the law faculty of a German university must be an "Abiturient" of a gymnasium, *i. e.*, he must have a general education equivalent to the one characterized in this country by the A. B. The course at the university demands at least three years' residence. He is then admitted to the "Referendars" examination by the state board of examiners. If he passes this successfully he must get three years of practical experience as "Referendar" in the courts, etc. He is then admitted to the "Assessors" examination, and if successful serves another three years as "Assessor" with slight remuneration. Then without further examination he is admitted to the independent practice at the bar, to the judicial bench, to the "Bürgermeistersitz," etc. The course again is: thorough fundamental preparation followed by professional studies, and only after mental and theoretical proficiency has been acquired, practical experience is obtained under competent guidance. In this country the road to law still largely consists in "reading law with some lawyer," which sometimes includes the sweeping of his rooms (a lawyer's rooms are seldom dusty). If the embryo lawyer has high aspirations or money, or both, he takes a short course at a law school. This, however, is not necessary, for the state board does not demand as much. Whatever the shortcomings of the legal profession may be, the service of an apprenticeship is not demanded for either admission to or graduation from our law schools. In fact law schools are striving earnestly to improve the status of the profession by inducing students to pursue a liberal course of education before entering upon legal studies. The fact that one lawyer out of every five in this country is a graduate of a humanistic college shows that they have succeeded better than most professions in pointing out that general culture and not an apprenticeship in writing legal documents is the royal road to proficiency in the profession of law.

Although many amusing and many disgusting sermons are preached from the American pulpit, yet the theologian has on the whole never lost professional dignity. Suffice it to state that in Germany the course pursued by the theological student is similar to that of other professional students. In this country the course has occasionally been reversed with results as characterized above. However, the number of college-bred men among the clergy is second in number of the learned professions, viz. about one in four. The course here again is first theory, then practice.

Although many of us are not yet old and gray, our memory may recall the fact that the common school teacher was appointed to his position not on account of his qualification as teacher, but out of political favoritism. How radically changed has the profession of the teacher become within a generation. Almost every state in the Union demands a well-trained teacher, and is willing to pay a professional price for his labors. The course is first general education, then normal training, then practical experience. Imagine for a moment a fledgeling from the grammar school applying for the position of an apprentice in a school in order to get practical experience in teaching, so that when he applies for admission to the normal school he may better appreciate his studies! To place pupils under the care of a teacher's apprentice would be branded as an act of insanity, and a community that might tolerate such a condition would be denounced as barbarous. Yet this process is not only tolerated in pharmacy, but is actually recommended and demanded by pharmaceutical schools and colleges. The life of patients is thousands of times daily in this country placed in the hands of ignorant apprentices, who are given the privilege of experimenting with human health and life, in order that the apprentice may learn all those little manipulations so dear to the heart of the druggist (leaving out of consideration the pocket-book of the latter) and that he *may acquire a desire to learn something about the science of pharmacy*, the art of which he is to acquire before he has a notion of the science.

While writing this I hear the old and oft-repeated argument ringing in my ears that the conditions under which the pharmacist labors are totally different from the conditions that surrround other professional men. This is true, and yet it is not. It is largely true, I am sorry to admit, not because there is any inherent factor in pharmacy that prevents its being raised to a high rank professionally, but largely because the pharmacist, through neglect of professional ethics and dignity, has permitted the degradation of his calling to a mere trade. At the same time other professions, possibly less protected by laws and more open to competition, have attained more enviable positions. To attribute these conditions to the "Zeitgeist" is very well if we do not forget Goethe's definition of this term: "Der Geist der Zeiten, das ist der Menschen eigner Geist," and that the lethargy of the pharmacist has contributed largely in negative values to this "Zeitgeist."

If I am not mistaken the German chemist has recently, after prolonged clamoring, received legal recognition and protection of his profession and the public. He demands a high standard, and although he had no tradition to back him he succeeded. If conservative pharmacists will deny the privilege of analogy between pharmacy and medicine or the other learned professions, they certainly cannot deny the logic of a conclusion drawn from a comparison between the pharmacist and the chemist. The professions of the two are so closely allied that many people use the terms as almost if not altogether synonymous. Again I go to Germany for illustration. That the German pharmacist is better educated than his American confrère no one who is acquainted with the same will deny. That the German chemist at present leads the world, no one who visited the World's Fair last year and admired the German chemical exhibit will question. We have here, then, an admirable ground for comparison. How the German pharmacist is prepared for his professional work we have already learned. What, then, is the process of education and training of the professional German chemist?

In enumerating and discussing the conditions that have led to the present supremacy in the chemical arts on the part of Germany, Dr. Witte, in his admirable little treatise on the development and present status of the German chemical industry, "Guide through the Exhibition of the German

Chemical Industry, Columbian Exposition in Chicago, 1893," p. 4), states that last but not least German chemists have *refrained from taking apprentices*, but have demanded as qualification a *thorough scientific education*, based as it must be in Germany on a previously acquired liberal education and on general culture. I cannot refrain from quoting at this point a few sentences of Dr. Witte's introduction. He writes: "But the most remarkable and the most *important* result of this intimate, and for both parties, salutary co-operation of science and technique, lies in the fact that German industry, mindful of its continuous striving for further development, *has disdained at all times to educate its auxiliaries by means ordinarily adopted in handicrafts. The practice, known in other branches of manufacture, of taking apprentices, has never obtained, even experimentally, in German chemical factories. On the contrary, the kind of preparatory training required for admission into a chemical factory has always been exclusively that of the scientific investigator.* Manufacturers only require of their assistants a thorough scientific education, taking upon themselves their initiation into the technicalities of their special branch of business, a task rendered at all times the easier by the fact, that from the very first day the young chemist finds occupation, he also finds the means of gradually becoming acquainted with his duties in the laboratory never found wanting in a chemical factory. If confronted in his future career with new problems, he falls back for their solution upon those methods of strict scientific investigation, so familiar to him in his student days. Not by desultory groping, but by judiciously arranged series of experiments, he seeks for and finds the solution of the difficulty."

Yet in the face of such results, and in the same city that last year contained the German chemical exhibit, the Chairman of the Educational Section of this Association, in his address, made a plea for the precedence of practical training to theoretical education, which no doubt was considered by many who gave the address any thought whatever an excellent plea for the apprenticeship system. With all due respect for the writer's opinions, I beg to take issue with the gentleman. The analogy drawn is far from being perfect; and even if it seemed perfect, practice would show it to be fallacious. The writer (*Proc. Am. Pharm. Assoc.*, vol. 41, p. 220) compares the training of the drug apprentice to that of a child which is taught to walk, and to walk perfectly, without any knowledge of the muscles that come into play in this exercise. He appears to have forgotten that when the child has stumbled, it can call for its mother to amend the ills, or that if the mother's knowledge does not suffice to relieve pain, the physician or surgeon is called upon for assistance. The child uses its anatomy (deranges it and has it mended, E. K.) without knowing much about it. "Even so," says our writer, "a large amount of the information expected from pharmaceutical students could be done without." By this surplus "knowledge" evidently is meant a comprehensive understanding of the natural sciences in general, of scientific theory. It is no doubt true that any person skilled in the manipulations of pharmacy can compound a physician's prescription. However, if the prescription contains an incompatibility, if the incompatibility is not one of the common ones in which he has been drilled; if the chemical prepared according to a new process contains an impurity not mentioned by his former preceptor or even college professor; if the galenical preparations on his shelf behave differently from what he was told they would and should behave, what then? He has no skirts to cling to, like the infant with which he has been compared—no mother to appeal to for help. Even the physician cannot be his counsel, for how can one blind man lead another? He may appeal to all the gods and goddesses of science, whom he has formerly despised, but the only answer he obtains will be that of Elijah the prophet: "Cry aloud; for he is a god; either he is musing, or he is gone aside, or he is on a journey, or peradventure he sleepeth and must be awaked."

Even if the analogy seemed perfect, I have stated, practice would prove it fallacious. The writer states (p. 221): "Nature has a habit of compelling us to act first, and acquire the meaning of such acts afterwards. As a rule we have no desire to know why a certain act is possible until we have first tried it. Let students of pharmacy learn tests for drugs they are handling, and they will desire a knowledge of chemistry. Have them volumetrically assay samples, and they will inquire into the principle by which it is done. Teach them to distinguish between genuine and spurious herbs of the kinds supplied by druggists, and they will long to know something of botany. Show them genuine and spurious powdered drugs under the microscope, and they will soon want to know something about that instrument. Practice them upon marked cases of incompatibility that can be corrected, and they will endeavor to ascertain why the difference exists. In fact, action brings hunger, and hunger provides good digestion and good assimilation. To cram mental pabulum on minds unprepared for it by awakened desire is to court mental dyspepsia, and encourage mediocrity or imbecility."

It is strange doctrine indeed, that a student should acquire the elements of chemistry, such as a knowledge of atomic and molecular weights, chemical equivalence, chemical reaction, etc., by beginning with volumetric analysis of commercial articles; or be initiated into the minute details of vegetable anatomy through the study of spurious powdered drugs, in which the anatomical elements are warped by drying or torn to pieces by drug-mill, grate or mortar.

To some, at first thought, my criticism may seem unjust. It may be said that the apprentice is not taught to analyze chemicals volumetrically, or to examine powdered drugs microscopically by his preceptor (so much worse for the apprentice); that if he were he would desire to learn something about chemistry and botany. Such an argument would be even worse than the first. It is not so much the example I have ventured to criticise, it is the underlying principle. The author himself will not admit that his source for illustration is limited to the two examples quoted. Such an insinuation of poverty would be a gross injustice to the writer.

The facts are simply these. The apprentice is daily brought in contact with materials of scientific interest in a hundred different ways. He sells copperas any number of times and yet he may remain as ignorant of its chemical composition as the senator from Michigan. He may dispense a volatile oil or an alkaloid and never feel the desire to learn about source, method of preparation or chemical composition. Even when told about them, he only too frequently has no interest in the matter at all, and even ignorant of the fact that knowledge can be turned into gold, would much rather chat with a fair customer at the soda fountain, or talk about base ball over the cigar counter. If these statements are not true, why is it that less than ten per cent. of the druggists of the United States are graduates from pharmaceutical colleges, though most of them permit their students to keep up their soda-water and cigar specialties during the so-called college days? If the course described by the writer is the "natural" one, if "action brings hunger, and hunger provides for good digestion and good assimilation" mentally interpreted, why is the English language so badly misused, why should teachers from all grades from grammar school to university make such an ado about poor English? How many of those who heard the address, or read the same in the "*Proceedings*," have taken the trouble to look up what their "*levator labii superioris alaeque nasi*" is, though their attention was called to it so forcibly and even sarcastically?

The speaker furthermore stated that "when theory precedes experience we get dreamers as a product." If the German chemical industry is a castle in the air, if it is the product of dreams, then let us have dreamers such as the German scientists are, according to our advocate of experience before theory. Then let our confession of faith be the dictum of the genial chemical philosopher, August Kekulè, the father of the benzol theory: "Und wer nicht denkt, dem wird sie geschenkt, der hat sie ohne Sorgen."

In fairness to 99.99 per cent. of humanity I would, however, add that it is not the province of every one to dream. Certainly benzol theories are not always the product of dreams. But a sound education, a well-trained mind and a comprehensive knowledge of his field, are the essentials of the prospective pharmacist, as well as of any other professional man.

RESUMÉ AND CONCLUSION.

The apprenticeship system is the natural outgrowth of an economically primitive society. It was at its prime under conditions of trade totally foreign to our own times, and under educational conditions largely outgrown by the civilized world.

While supplying the demands of a time that gave rise to it, it was prosperous and useful. This age of prosperity, however, was soon followed by an age of degeneration, and in modern times it has a hold on many merely as a cherished tradition, the shell of a kernel that has decayed.

To-day it is not only largely useless, but positively damaging, inasmuch as it, as a rule, prevents: first, the acquisition of a good preparatory education; second, the acquirement of a systematic and specifically professional training.

As a source of evil it works more harm in this country than in most other civilized countries, because, with few exceptions, we have never had master pharmacists deserving of the name, the most fundamental requirement for a good apprenticeship after a thorough preliminary education.

One of the consequences of this morbid growth is the worst of all evils, viz., the average druggist of to-day is not only unprofessional, but he cannot even conceive what a professional pharmacist ought to be. If a profession or calling recognizes its shortcomings there is hope for the correction of the same. To try to administer to a sick body that claims to be in good health is an almost hopeless undertaking.

In Germany, a country that at present leads the world in science, pharmacy is the only profession that trains its aspiring disciples by demanding of them service as apprentice. The consequence is, that, although the German pharmacist may be said to lead the world in his profession, yet in his own country, when compared with men of other professions, he is found wanting.

The cause for this shortcoming, it is admitted by German pharmacists themselves, lies in the fact that the time of service as apprentice and assistant cuts short both his general culture course at the gymnasium and his scientific education at the university, separating his theoretical education, general and professional, by six years.

German pharmacists, who desire that the status of their profession be raised to the level of the other professions of their country, therefore demand the placing of the pharmaceutical aspirant on a similar educational basis with that of the other professions. (What that means need not be repeated here.)

In this country the only calling that can at present be designated a learned profession, that of engineering, knows nothing of the apprenticeship system.

The other professions, in the order of their standing, are more and more abandoning the same, whereas pharmacy, which still clings to traditions most tenaciously, is usually classified, not with the professions, but with the trades.

Whatever pharmacists may think about the logic of a comparison between the educational course pursued by the physician, the engineer, the lawyer, no one can deny that the chemist stands in the closest possible relation to the professional pharmacist, and that the former has by far outstripped his older colleague.

Few if any persons will deny Dr. Witte's statement that the eminence of the chemist depends in no small degree upon the fact that he has broken with the traditional course of apprenticeship and demands a high type of scientific education, based upon broad culture and thorough mental equipment.

The lesson to be learned lies at the surface. Pharmacists, in order to push their profession to the level of other professions of this country, must follow the universally recognized educational course of these professions, *i. e.*, the highest course of the same.

It therefore becomes the duty of teachers to urge such pupils who desire to become pharmacists, to be content with nothing less than graduation from an accredited high school or similar educational institution. I say with nothing less: the type of general culture indicated by the bachelor's degree would be far better.

It furthermore becomes the duty of the pharmacist, whose pocket-book does not cause him to be short-sighted, to refuse to take apprentices, but to entrust the life and health of his customers to none but thoroughly trained men, and not to uneducated or even illiterate boys.

Last, but not least, it becomes the duty of schools of pharmacy to raise not only the standard of their course to that of university courses in general, but also the standard of admission to that demanded by other university colleges and schools. That such a procedure would gradually do away with the apprentice, would be a matter of rejoicing and not of regret. It would further have the effect of placing pharmacy among the learned professions.

THE DRUG STORE AND THE COLLEGE.

BY L. E. SAYRE.

Some years ago a physician made a tempting offer to induce me to take a young man (a student of medicine) into my employ solely for the purpose of imparting to him a knowledge of the principles of pharmacy, amounting to what might be called a short practical course. It was not the financial inducement so much as a desire to accommodate a friend that finally led me to assume the charge. After a few weeks of such responsibility, I became very tired of my "bargain," and at the termination of the contract I felt not a little relieved; it was as a burden lifted. I believe I never before nor since realized the gap which exists between the drug store and the college; between what is known as shop training and college training. My time was so constantly demanded by the store and occupied with business cares that it required an effort which I did not before realize, to make at times a sudden turn and concentrate my mind upon the one idea of teaching, and for the time being convert my laboratory and store-room into a class-room; and yet to perform my duty conscientiously I felt this was necessary to do at stated times almost every day.

I believe I am saying only what has been said over and over again, and in perhaps the same words: Practical shop experience can be acquired in no other place than the drug store, and a college education can be obtained in no other place than inside the college walls. The practical laboratory work of the college, which devotes its time, as it should, to the practical demonstration of the teaching of the class-room, should not be intended as a substitute for that peculiar experience which is gained behind the drug counter. I think it is admitted that to-day it requires both of these to make a pharmacist in the sense in which the word is used by the druggist and by the body politic. It also is admitted that the college or school gives a training which cannot be accomplished by the shop, and the shop gives a training which cannot be accomplished by the college.

If I were to characterize in simple terms the quality of the two kinds of training, I should say that the one was business-like and the other professional or rather technical in character. Of course, I do not mean by this that either the college or the shop confines itself within these boundaries. It would be a poor college professor who did not occasionally indulge in a lecture on the business side of pharmacy, and it would be a curious specimen of a pharmacist who would not now and then indulge in comments upon the scientific principles which underlie the profession which his business represents. But the aims and purposes of the proprietor and preceptor, and those of the teacher or professor, are almost directly opposite.

This divergency of interest was not so apparent in former years, when the college course was comparatively limited; but as time has advanced, it has become more pronounced, until the college in some parts of our country, feeling itself fully occupied with its immediate work, asks to be relieved of the responsibility of looking after, and holding itself responsible for, the shop training. In doing this it does not seem to underrate the value of shop training, but it merely wishes to be relieved of the vouching for that over which it has so little control.

Endeavoring to look at the matter from an unbiased standpoint—as the public might look at it—it seems to me it does not matter upon whom the burden of this duty rests, the important thing is that it shall be looked after by proper and responsible parties. Whether this responsibility rests upon the college or the State Board is perhaps immaterial, provided the investigation is properly made.

It seems to me that in either case shop experience will always be found to be an uncertain and variable quantity—dependent upon the quality and faithfulness of the preceptors who have the supervision of such work. Comments here are unnecessary, as every one knows that the personal equation of the preceptor is by no means a fixed quantity.

The question has frequently been asked me, why not adopt the plan of some of the colleges—be relieved of this burden and only look after the college work—give credit for this, and let the other take care of itself? My answer to this is, that whenever it shall be agreed that this shall be looked after by others, I shall be only too glad to resign that part of the work. I wish very much that some unity of action could be adopted by our various colleges, but I should be very sorry to adopt any plan which might be misunderstood by the shop, and that would tend to disturb the intimate relation which now exists between the two.

In the University of Kansas, the personal contact of the professor with the student, and his intimate relation with the student's preceptor, gives him a peculiarly advantageous position to judge of the value of shop training; but it is a question whether it is best after all for him or the institution he represents to continue to vouch for this experience. I should not like to urge any radical change from present methods unless the change be recommended by our State Board of Pharmacy and thoroughly acceded to by our Board of Regents.

The question has occurred to me, What would be the value of a diploma issued by the University which does not in any way vouch for practical drug store experience, as compared with a diploma, as it now stands, which does vouch for this in a measure? Assuming that the college training in both cases be precisely the same, whether the experience be had or not, it is clear that the diploma in the latter case, where the experience is had, represents more. It is true it would represent also values more variable, but it would in every case mean more. I think this is the view that any unbiased person would take, and the view the public would take. As before stated, I should be very happy indeed to relieve myself of the responsibility of accounting for, of verifying and vouching for the shop experience, and I am sure that this would be a change, if adopted by the Board of Regents, which the students, particularly those who are ambitious and impatient to obtain a degree, would welcome very heartily. It would doubtless increase the number of students on the class roll, but whether it would ultimately be an advantage to the profession of pharmacy in the State of Kansas is a question upon which I am endeavoring to get some light, and trust that it will be fairly and freely discussed at this meeting in the Educational section of our Association. In closing I would say that I am convinced of one thing, and that is that our educational institutions of pharmacy in the United States should come to an understanding, and an effort should be made in the direction of greater uniformity in this matter of pharmaceutical education in college and shop experience.

University of Kansas.

MICROSCOPY AND COLLEGES OF PHARMACY.

BY H. M. WHELPLEY.

QUERY NO. 15. What should be the minimum limit of knowledge in microscopy before being permitted to graduate?

A person who has been graduated in pharmacy from an American college is generally and very justly considered a competent party to conduct a retail drug store in any section of the United States. He, or she, is looked upon as one possessing the maximum amount of professional knowledge that we have a right to expect of a person discharging the responsible duties of a pharmacist. The trend of the times is for us to seek among the graduates for the examples of higher pharmaceutical education and exceptional technical skill.

Those interested in the progressive colleges of pharmacy, managed by earnest educators and wide-awake business directors, will realize the proper purview of the work before them, and see that the students are taught all that is consistent with the demands and conditions of pharmacy as it exists to-day. The pertinent question is not how little instruction can we give our students and have them pass muster as "Ph. G.'s." Those who are ready to sponsor the education of college of pharmacy students must give a practical answer to the interrogative, "What is the limit of requirements to which we can extend our curriculum of study?"

With such an understanding of the intent and purpose of modern pharmaceutical education the query, "What should be the minimum limit of knowledge in microscopy before being permitted to graduate?" might be resolved into the following: "How much information in microscopy should be made obligatory in a college of pharmacy to enable the graduate to utilize the microscope in his business?"

Before considering an answer to the above query, allow me to say that by microscopy in this connection I understand a study of the instrument and a practical knowledge of its application in pharmacy. The value of the microscope to the pharmacist depends upon its use in studying drugs for the purpose of identification or determination of purity. To this must be added the microscopical examination of urine, sputum, and other work for physicians.

In order to become proficient in the above subject, the student must be taught the principles of optics and shown their application to the microscope. This instruction can be followed by a study of the mechanism of the various styles of microscopes and a practical drill in the manipulation of the instrument. Such instruction will prove of great value when the student desires to select a microscope from the many kinds on the market.

The preliminary preparation of substances for examination should be so thoroughly taught that the student will, after graduation, experience no difficulty in deciding how to treat a substance for examination as soon as he determines its nature. As an example, he should learn why some objects are examined dry, others moistened with water, glycerin, oil, or some other mounting medium. The work of sectioning vegetable, animal and mineral specimens requires study and experience. The principles, at least, should be given the student. The use of stains is of sufficient importance to demand special instruction and numerous demonstrations. The recognition of the more common urinary sediments and a demonstration of the bacillus tuberculosis demand a place in the pharmacist's course in microscopy.

The study of vegetable histology should be carried on to such an extent that all tissues and the more characteristic of the common drugs are readily recognized by the student.

The teaching of microscopy in a college of pharmacy may be confined to laboratory instruction or divided between a series of lectures and a course in manual work. In either event the students must receive didactic information. I prefer to separate the lectures and the laboratory drill.

The amount of time which a college of pharmacy student should devote to the subject of microscopy as a special branch depends upon the extent to which he is drilled in the application of microsopy in the study of botany, chemistry and pharmacy by those in charge of these respective departments. I find so little uniformity in the division of labor among the teachers in the various colleges of pharmacy that I hesitate to affirm a rule for this work.

As a short and succinct response to the interrogation made by the Committee, I should say, " Require of every applicant for graduation a thorough knowledge of microscopical technology, and sufficient learning in the application of microscopy to pharmacy that he may be able to test all medicines suitable for microscopical examination, inspect food stuffs, etc., for the public, and perform such microscopical work as the physician may request of him."

Anent this subject I must refer to a detailed exposition of the home study of microscopy by pharmacists, which will be found in the paper entitled " A Synopsis of a Course in Microscopy for Pharmacists," which I contributed to the 1890 meeting of this Association. The article appears on page 252 of Volume XXXVIII. of the Annual Proceedings.

Unfortunately, the pharmaceutical profession is not supplied with a suitable text-book for students in microscopy, but no doubt the demands of the times will soon call forth literary efforts in this direction. As a guide for the student of microscopical technology, either at college or for home study, I can heartily recommend " Microscopical Methods " by Gage.

PRACTICAL EXPERIENCE IN PHARMACY AND STATE BOARDS AND COLLEGES.

A Paper suggested by Queries 1, 10, 13 and 20.

BY W. BODEMANN.

QUERY 1.—Should students of pharmacy be required to give evidence of having had experience in a drug store before permitting them to graduate or register, regardless of quantity or quality of knowledge possessed?

QUERY 10.—Should graduates in pharmacy be compelled to pass the examinations of Boards of Pharmacy before being registered?

QUERY 13.—How can Colleges of Pharmacy be placed upon a purely educational basis, instead of being conducted for the money they can make?

QUERY 20.—Would it be a gain or loss to pharmacists to compel would-be apprentices to pass a Board of Pharmacy examination on their general education before permitting them to begin work in a drug store?

No State Board should register any person as a Pharmacist or Assistant Pharmacist without absolute proof of a fixed term of actual employment in an actual pharmacy where physicians' prescriptions belong to the daily occurrences. It would not require a legal opinion to draw the line between the soda-counter experience and the actual pharmaceutical experience. In most States having Pharmacy Laws, this is already required, and it is not only the right but the duty of the State Boards to enforce the law in spirit and letter. A Pharmacist—all Pharmacists—should have four qualifications:

1. Good common schooling. If Pharmacy is a profession, then it should require at least as much schooling to be a pharmacist as it does to enter a high school. If any member of the American Pharmaceutical Association thinks this is too much to ask of a pharmacist, then I would thank him in the name of our "profession" to enlighten this body by telling us how little schooling would be sufficient to entitle a pharmacist to the boast of practicing a profession. If a board of pharmacy cannot insist on as much "education" for a candidate for registration as is expected of a fourteen-year-old boy or girl, then let us drop the claim that pharmacy is a profession or that our calling has a scientific character. If a candidate for registration furnishes proof of having gone through the grammar school with satisfactory result, then the State Board need not or should not insist on an examination in common school branches. But, if candidates do not furnish such proof, then in the name of common sense and consistency let there be an examination. It would be a downright farce to register anybody who cannot read, write, reckon and think correctly, even if he has been successful in "cramming" just enough to answer the usual questions in pharmacy and materia medica, and has spent a few years behind a counter.

2. A registered full-fledged pharmacist should have finished satisfactorily a definite minimum course in a college of pharmacy, and

3. He (or she) must have had at least three years' real experience in a real pharmacy, worthy of the name, and

4. He or she must in every case undergo a practical examination before a Board of Pharmacy.

Colleges should not require practical experience for graduation; they have plenty to do if they attend to their business, and that is—teaching faithfully and effectually. It is not the sphere of colleges to decide who shall be registered, and if their diplomas were recognized they would in effect decide this question for their graduates. It is the business of the State Boards to find out to their own satisfaction whether an applicant coming before them is fit to be registered, and to refuse to register all who are unfit by reason of illiteracy, insufficient special education, too limited experience in technical routine work, or inadequate skill in actual dispensing. College authorities are not in a position to find out if the drug store experience of candidates coming before them was *bona fide* pharmaceutical experience or not. College examinations can testify to the amount of theoretical training their students have had and to the amount of skill they displayed in the laboratories, if laboratory work is embraced in the curriculum, but there it rests. A college diploma is no more a certificate of sufficient experience in drug stores than a certificate of vaccination could be passed for a bank bill. It is entirely clear to my mind that if diploma recognition for purposes of registration is abolished, all graduates in pharmacy being required to take the State Board examinations, and all colleges left to their legitimate work, the colleges will soon be placed upon a "purely educational basis" and rated at their real worth, on their own merits. To mix up the duties of colleges and State Boards is detrimental to both. It does not elevate the position of any college of pharmacy to demand that its graduates be exempt from State Board examinations. I respect any college of pharmacy to the full extent of its real worth, and I would certainly think more highly of all colleges if they would recognize the handwriting on the wall, and give unto Cæsar what belongs to Cæsar; and the sooner and the more gracefully the colleges abandon the exercise of functions belonging to the State and the State Boards, the higher my respect, and the better for the colleges, the Boards, the graduates, and last, but not least, for the candidates for registration.

Since the Educational Section of the American Pharmaceutical Association raised the question, "How can colleges of pharmacy be placed upon a purely educational basis, instead of being conducted for the money they can make?" it cannot be considered a lèse majesté for me to discuss this question. It should be a libel on the colleges of pharmacy to bring this Mason and Dixon Line into this convention. Take away the commercial value of your diplomas, which they have when used as substitutes for State Board examinations. While this is not by any means all we should strive for, it is decidedly the first and most necessary thing to be done to elevate our colleges to the purely educational basis. I do not believe that any college of pharmacy worthy of the name is conducted for the money it can make, nor do I believe that any college giving a reasonably good course of instruction, including laboratory work, can make any money at all; indeed, good colleges are in luck if they pay running expenses. It is said that it takes three things to conduct war, namely, money, money and money; this applies equally to the running of a *good* college of pharmacy.

To make our pharmacy laws amount to something, the State Boards must have full swing and must shoulder all responsibility for the candidates they admit to the practice of pharmacy. Recognition of diplomas is too convenient for both Boards and colleges. The same is true of the practical experience required for registration. The Boards must settle that to their own satisfaction and in their own way, and not take for granted that a graduate of pharmacy has had satisfactory experience, simply because the college from which he graduated requires practical experience for graduation. This requirement amounts to nothing in reality, even if the proof consists of affidavits, which, according to Shakespeare, are more plentiful than blackberries. The registration of apprentices by the Boards is the only true method. If the signature of Board members on a registration certificate stands for anything at all, it should stand for conclusive evidence of practical experience. If you want a certificate of special education, ask for the college diploma. Both stand for a definite thing, and both are good just for what they are worth. Neither can or should take the place of the other.

THE PRELIMINARY EDUCATION OF APPRENTICES IN PHARMACY.

A Paper in Answer to Query No. 20.

BY OSCAR OLDBERG.

The necessity of a satisfactory preparatory education of those who enter drug stores to learn the art of pharmacy has been again and again asserted in this Association. Yet, no progress has been made. Under our laws every drug store must be conducted by a "registered pharmacist," and, therefore, every manager of a drug store is a pharmacist. The boy he takes into his store to learn the business becomes an apprentice, and a drug clerk, or the proprietor of a drug store, in the course of time. No matter how ignorant he may be, having gotten *in*, he very rarely gets *out* again.

Every intelligent man, who honestly and earnestly desires to see the day when a satisfactory standard of education shall be established in our profession, must realize that at the bottom of any shortcomings in that direction lies the absence of restraint upon the introduction of unfit recruits.

Only a small proportion of these apprentices, and generally the better part of them, ever come to the colleges of pharmacy. Hence the colleges cannot remedy the evil.

There seems to be no way by which the influx of unfit material can be prevented, except through the State Boards of Pharmacy.

A person who has not gone to school long enough to learn to spell common English words or to estimate correctly the quantities required for the production of a given amount of a solution of any fixed percentage strength, or to calculate the size of each single dose of a poisonous ingredient in a prescription, cannot be fit to become a pharmacist; and this is so self-evident that in the absence of any specific legal standard of a preliminary education of apprentices, it is the duty of the Boards of Pharmacy to examine into the fitness of all candidates for registration, not only with reference to their knowledge of chemistry and pharmacy, but also with reference to their general intelligence and education.

The introduction of a fixed minimum standard of compulsory preliminary education of apprentices must be brought about; but, until this shall have been accomplished, the State Boards should refuse to register as a pharmacist or assistant pharmacist, any candidate whose preparatory education is of so low a grade as to render it plain that he never ought to have undertaken to learn chemistry and pharmacy. The scholars of our public schools are not allowed to enter the high school until they are fitted to do so; why should any one be permitted to enter upon the study of pharmacy until reasonably prepared for it?

The lowest standard of compulsory preliminary education that might at first be adopted is one equivalent to the requirements for admission to the best American standard high school. If the State Boards of Pharmacy would henceforth require at least that amount of general education of every candidate for registration, we would at once begin to make marked progress. Examinations of candidates to determine their general education might be omitted in all cases where satisfactory evidence is presented by them showing that they possess the education required.

No real general improvement in the status of pharmaceutical education can be expected without positive measures to compel sufficient preparatory education, and a sufficient standard of the compulsory preparatory education of all persons who enter drug stores to learn pharmacy is no less important than the pharmaceutical colleges, the pharmacy laws, and the State Boards of Pharmacy.

THE DEMANDS OF PHARMACY UPON ITS GRADUATES.

BY W. W. KERR.

It augurs well for the future of Pharmacy in this country that so much attention is being paid, in recent years, to the preliminary education of those who are to engage in its practice hereafter, and to the discussion of the question of what should constitute that initial training. It is a healthy outgrowth of the impression that has been slowly but surely fastening itself upon the minds of pharmacists themselves, that theirs is a learned profession, taking rank with the other learned professions, and like them demanding a peculiar fitness and a special training. This impression has been years in taking shape and formulating methods, but it is just now experiencing a spirited revival as the result of its reflection from the profession to the people, where it has crystallized into pharmacy laws and is now, by reflex action, coming back upon its originators in the shape of louder and more exacting demands for higher education. There is no longer room for discussion as to the necessity for this special preliminary training, nor limit as to the height to which it should be carried, but the question is, in what shall it consist? What shall constitute the armament of those who are turned out from our schools as competent to dispense the physic upon which the lives of thousands hang? It of course rests with the colleges of pharmacy to determine the methods by which the instruction may be best imparted, and largely as to the extent to which it should be carried; but as demand must always regulate the quality as well as the quantity of the supply, their curriculum must be to a great extent measured by the demands of the profession at large, and it is therefore pertinent that those demands should be made known from the standpoint of the consumer, that the supply may be regulated accordingly, and it is to this fact that this paper owes its existence.

In this discussion, as in most others, there are two extremes and two parties, the one tending to the one pole and the other to the other, which is probably the best way to determine the "happy medium" along which the true policy usually lies. Very naturally the tendency of the teacher of pharmacy is in the direction of the higher scientific education of the student in preference to the more practical, while with the *officinal* pharmacist —if I may be allowed to resurrect an old word and give it a new meaning —the tendency is toward the practical rather than the scientific. I would not be construed as underrating the great advantage of a careful, technical education, or underestimating the substantial progress being made of late years by the schools in the direction of the practical, but on the other hand I heartily recognize and appreciate both, and am simply desirous of contributing towards the further promotion of the latter, without in any degree lowering the standard of the former.

The young graduates, when they leave college, enter the service of one of two patrons; the retail pharmacist, as clerks, or the public, as proprietors. By far the larger part probably assumes the first relation, and as the requirements in either case are substantially the same, it will be sufficient to ascertain the "demands of *pharmacy* upon its graduates." Now practical pharmacy includes three classes of duties which may be set down as: professional, comprising the identification, preservation, testing, compounding and dispensing of drugs and chemicals; manipulative, embracing the care of the stock, its proper display, the ornamentation of the store, etc., and the commercial, or buying and selling, and generally the business management. A fair knowledge of these several classes of duties in all of their details, will be exacted by the employer of those who come to him as applicants for positions as skilled assistants; these taken together make up his estimate of competency. Now a diploma from a first-class college of pharmacy is supposed to be a guaranty that its holder is fully competent professionally, morally and every other way, to discharge the duties pertaining to the practice of pharmacy, and when presented to a prospective employer, has a right to be so recognized; and if things that are equal to the same thing, are equal to each other, then the diploma and competency are, or should be, interchangeable terms. But is it possible to meet the conditions of this axiomatic formula?

Possibly with our present facilities it is not and may never be, and yet the demand is not unreasonably exacting, and will not be lowered, and hence must ever remain the goal of pharmaceutical teaching, though like the circulating decimal, it is ever approaching and never reaching, it must go on and on in that direction.

Several conclusions may be drawn from these considerations. It would lengthen this paper too much to attempt to cover the whole ground. Two or three lying nearest the surface must suffice.

The first is, that the diploma of a college of pharmacy must represent a greater or less amount of practical experience. This must follow if it be admitted on the one hand that experience is an element of fitness, and contended on the other that these institutions are competent to perfect that fitness. That this is a difficult feature of the contract is not denied. To fit the student for the proper discharge of the first class of duties mentioned above, is easily within the reach of the college curriculum, but to include the other two is, for obvious reasons, more difficult, and can only be compassed by resorting to the only source of supply at present available, and that is the shops where the business is conducted. It is hardly sufficient to urge that it is unfair to exact of a college faculty to certify to a proficiency which is not in their power to confer, and of which they can have no personal knowledge. If practical experience is an essential pre-requisite of a finished pharmacist, then somebody must be responsible for its presence. Certainly the future proprietor cannot be expected to go back of the returns and invest his money and his reputation in an experiment upon which such grave issues hang; the State Boards of Pharmacy have no means of recognizing its quantity or its quality not enjoyed to a greater degree by the colleges; and so it is thrown back upon those who labeled the package to become responsible for its contents—and hence the great work before our schools should be in the direction of overcoming the difficulty, rather than urging it as an argument for shifting the responsibility upon some one else.

A second deduction is, that the practical training should be contemporaneous with the college course rather than before or after it. When it precedes it, the trouble lies in determining its character from want of personal knowledge as to whether it was obtained in a saloon with a patent medicine attachment or in a legitimate pharmacy, and if in the latter, whether at the cigar or prescription case. The same is true to a great extent when it succeeds it. But when both are carried along together, the practice forming a part of the course, as it were, as far as possible in the vicinity of the school, and to some extent under the eye of the teacher, the difficulty will be largely overcome. But here again the impracticability of the scheme, in most cases, will be urged against it. In this age of progress the impracticable is fast ceasing to be an impediment to the onward march of improvement; it is becoming an obsolete term in pharmacy as well as elsewhere. While it is true in the cities where our schools of pharmacy are located, employment could not be found for all the students within their walls, there are hundreds of pharmacies all over the country, including many of the smaller towns, conducted by professional proprietors on a professional basis, and where in many respects the very best practical training can be obtained, which by proper concert of action with the colleges, might be utilized to supply the demand. The fitness of these establishments can be easily ascertained through the several state associations and the Boards of Pharmacy, if a systematic and united effort in that direction were organized, and as time rolls on their number will increase, until the great end to which the whole movement looks be accomplished, when any drug store in the country will be a fit school for training our students of pharmacy in the practical duties of their profession.

Finally, it may be seriously doubted whether our colleges of pharmacy have yet done all they can within themselves towards perfecting this branch of a finished pharmaceutical education. What has been accomplished justifies the prediction that more may be. There are fixed principles underlying business and the general management of a store, just as in the case of pharmacy proper; and why may not these be formulated into lectures and other methods of imparting instruction, which will be as effective in shaping and guiding the future course of the students? That teacher has largely failed in his work, who does not succeed in impressing his own individuality and his own methods upon the minds of his pupil—who does not impress him with the idea that he is the greatest preceptor in the world in his particular line; and why may not this influence be exerted in the direction of fixing sound business principles and correct manipulative methods, as well as pharmaceutical skill? The increase in the length of the course from two to three years, already adopted by some institutions and contemplated by others, will afford increased opportunity for including this sort of teaching in the regular curriculum, and "the demands of pharmacy upon its graduates" call loudly for the innovation.

"WHAT OBJECTIONS CAN BE URGED AGAINST BESTOWING THE DEGREE OF DOCTOR OF PHARMACY UPON GRADUATES OF PHARMACY WHO TAKE A POST-GRADUATE COURSE?"

BY ROBERT J. SNYDER.

I promised to answer the above query, and do so to comply with the promise, but with much less confidence than I had anticipated, having misapprehended the post-graduate clause in a desire to "ease my mind" on the Doctor of Pharmacy feature.

The objections to be urged against conferring the degree are many.

First. In this country at least, we have no precedent of note.

Second. It is a degree that has been reserved for those of the profession who have won distinction by years of meritorious service in the cause of pharmacy, and would, therefore, detract from the honor that such men justly bear.

Third. It is a title that has been practically monopolized by graduates of medicine, dentistry, veterinary medicine, divinity, law, etc., etc., consequently it would not become so modest a profession as ours, at this late day, to appropriate it.

Fourth. Our seniors having failed to recognize our claim to such honorable distinction, it would seem to be a reflection upon their wisdom, which our reverence for them would forbid.

Fifth. Having progressed in a phenomenal degree in the past decades without such aid, we need no such stimulus. The future of the profession is assured.

Sixth. It would excite the sneers of our brethren of the medical profession and render us a laughing-stock for others, with all the disagreeable attendants.

Similar or equally cogent objections might be multiplied, but those stated are deemed sufficient to forever set at rest the question, without urging deficiency of years, experience and knowledge on the part of the graduate; or provoke such a discussion from abler and more experienced members, as might change our views and give the subject much more thoughtful prominence than heretofore. With such hope, the objections are respectfully submitted, and your indulgence asked by the writer if he animadvert upon the same.

The profession of pharmacy has ever been a modest one, preferring *to be*, rather than to seem, which is characteristic of the truly scientific of every profession, but that it is excessively modest as a profession, just now, I believe is susceptible of proof.

Until the organization of the American Pharmaceutical Association, save in a few favored localities, the difficulties that surrounded the student of pharmacy were innumerable, and of such variable character, that a uniform standard of accomplishment was difficult, or impossible of attainment, and every tub, so to speak, stood on its own questionable bottom. Throughout our country, in hundreds of instances, the craft were but hewers of wood and drawers of water for men of less merit and really less ability than themselves. But thanks to the noble men who organized the American Pharmaceutical Association, building if possible better than they knew, the conditions are changed, and under the impetus given pharmacy we have to-day a standard of high order, with institutions accessible to every pharmacy student in the land, which are unsurpassed in their appointments by those of any other profession, to qualify the student in the highest degree. It would therefore seem but a reasonable service that we select for the graduates of our Colleges of Pharmacy, if they represent a profession, as we claim, such a degree as is universally recognized as professional. That degree is Doctor, and regardless of our individual estimate of titles, we should adopt it for the benefit of the younger generation, if not for this one. Conceiving such to be an act of justice to the younger men of the profession, at a recent meeting of the officers of one of the teaching colleges, it was resolved by a majority vote that hereafter the degree of Doctor of Pharmacy would be conferred upon the graduates of the institution instead of Ph. G. as heretofore. The Secretary was instructed to fraternally notify the other colleges, inviting their co-operation. No adverse criticism of their action has yet been received, but at a subsequent meeting the resolution was reconsidered and the matter dropped for the time, that it might be brought to the close attention of sister colleges, with a possibility of favorable action by all at once. The officers of the college mentioned have not changed their minds in reference to the subject, but with no desire to take a seemingly trivial advantage of their neighbors, leave it in abeyance, believing that it will soon be recognized as the proper course for each college to adopt, and thereby give it the seal of authority by their united endorsement.

Each year the majority of our colleges have raised their standard, their preliminary examinations are more rigid, curriculum more extended and thorough, and the exactions and requirements for graduation ample to justify such action, especially when we are backed by the practically unanimous voice of the International Pharmaceutical Congress which met in Berlin in 1885—which said, "That all educated pharmacists graduating from pharmaceutical schools ought to receive the degree of Doctor of Pharmacy." Be it remembered, this resolution was passed not in the United States, but in an old conservative country, by distinguished men from many countries. Surely this alone should be sufficient to convince us.

As to the objections mentioned—the one of having no precedent is not valid.

That it would detract from the honor won by those for meritorious service is questionable. Many of those who enjoy the honor, received it after they were superior to it. And I have no doubt there are many present at this meeting who are indifferent, if not superior, to any title that a college might confer. Then why not pass the degree of "Doctor" to all graduates who accomplish satisfactorily the entire course at school, and reserve for savants "Master," "Past Master," or some other exalted title.

That the degree has been monopolized by the other professions is but an evidence of our timidity or excessive modesty, which it is time to put aside.

It is true our seniors have failed to recognize our claim to such exalted title, but instead of being a reflection upon their wisdom, it would be paying a just tribute to that wisdom which has made it possible and proper for us to claim a title that they have really helped to earn for us.

"Having progressed so favorably without the degree" would seem the hardest to answer. We have done without it, can do without it, and in spite of the fact are gradually convincing the other professions and the world that ours is a profession. Then why not confer the title upon the younger men, which would add to their dignity?

That we would excite the sneers of our medical brethren and be a laughing-stock for others is true only in a sense. The older members of the medical profession who have won honors by merit, the younger men who are thoroughly equipped and confident of their ability, would admire our courage and welcome us to such professional recognition. As to the first, I mention an instance: In an effort to defeat a bill before a Legislature recently, giving graduates of all medical colleges the right to practice pharmacy, without other preparation, and regardless of State pharmacy laws, appeal was made effectually to the Faculty of the State Medical College. In addressing the honorable Senate in our behalf, no less a person than the distinguished Professor Yandell used the following expression: "The Doctor of Pharmacy and the Doctor of Medicine represent two distinct professions." Surely if such as he, gray with years, full of honors in his profession and past the time when he could use flattery, has such a conception of our rank and file, we can afford to ignore the sneers of mediocrity.

I know the query embraced a more extended course to entitle the candidate to the degree, but considering the advance made in the past few years by almost every college, I am sure the curriculum and requirements of to-day would be equal to a post-graduate course in former years. Doubly true is this if, as I believe they will, all the colleges should follow the example of the old mother College at Philadelphia, and hereafter exact attendance upon three courses of six months each, before graduation. This, with some minor changes, would certainly be sufficient for the most critical objection. In any event the title is ours by right, and in the opinion of the writer should be appropriated without quibble or delay. Nearly thirty-five years of active experience, twenty or more as a director in a college, with a close observation of the two professions, confirms the opinion. We exact of our young men that they shall have a good preliminary education, four years of practical experience in the business, attendance upon two or more full courses of six months each, where pharmacy is taught theoretically and practically, embracing all modern branches and methods, with a rigid written examination to entitle them to a degree, and unless they abandon the calling they become in fact and at once doctors, *(teachers,)* to the junior or apprentice, which can be said of only a small percentage of those in other professions.

Ph. G. is an honorable and dear old title, and stands for much with us, but outside of our schools or journals is almost unknown. It is an unhandy title too, with which to designate on ordinary occasions, and trifling in character as applied to men who are, by education and service to mankind, the peers of the noblest of the earth. The effect of such a change of title to the graduate of pharmacy would be to increase the confidence of our young men in themselves, inspire the public with greater respect for them, practically annihilate the distinction between the profession of medicine and pharmacy, which has existed so long to our disadvantage, bring them closer together on equal grounds and make merit the final test all around. It would stimulate our younger men to greater achievements within our ranks, without forsaking it for one which has no greater field. It would induce a better class of men to embrace the calling and remain in it, and be no disadvantage socially. Of one thing I am sure, if the voice of the Alumni of the various Colleges could be taken, it would be overwhelmingly in favor of the change of title. Jealousy between the colleges, which I hope will always exist, for it is the very mainspring of their advancement, should have no place in our councils when it comes to the good of the entire profession. I earnestly hope this cause may find a champion in each one of the institutions represented here.

Should the crude argument here presented, if by courtesy it can be so considered, prove fallacious in the eyes of your honorable body, for whom I have profound respect, I plead sincerity of motive, and an honest desire to contribute to the advancement of a profession that has often honored the writer beyond his deserts.

SHOULD ALL GRADUATES IN PHARMACY BE ABLE TO CARRY OUT THE TESTS, ASSAYS, AND WORKING PROCESSES PRESCRIBED IN THE PHARMACOPŒIA?

BY OSCAR OLDBERG.

Prof. William Simon, of the Maryland College of Pharmacy, anwered the first part of this query a year ago. His answer was an able argument in support of the view that graduates in pharmacy should be expected to be competent to apply the pharmacopœial tests.

Further argument ought to be superfluous, and I shall not add anything except to invite attention to the fact that in the new Danish Pharmacopœia

(1893) it is explicitly provided that "every apothecary's shop must be provided with all the apparatus and vessels required or suitable for the preparation, preservation and testing of the official remedies in accordance with the directions of the Pharmacopœia," and that "the apothecary shall in every instance be held accountable for the conformity of the medicines to the requirements of the Pharmacopœia." To emphasize the importance of this last regulation, which of course has the force of law, the paragraph is printed in specially conspicuous type in the "Introdnction" to the work referred to. This fairly indicates how this question is considered in other countries.

All apothecaries conducting pharmacies in which medicines are prepared or dispensed, ought to be competent to apply, intelligently, any and all of the pharmacopœial tests and processes; but cnly a comparatively small number of our drug stores have, or use, any reagents whatever.

The pharmacist can learn how to apply the analytical and other processes of the Pharmacopœia only in pharmaceutical schools which have the requisite laboratory facilities and include adequate courses of laboratory practice in the required work.

It is, of course, extremely difficult to make any close estimate of the amount of laboratory practice required to fit the student to intelligently and successfully perform all the pharmacopœial tests, assays, and working processes; but it is scarcely possible that really valuable results can be gained from any courses aggregating less than about 500 hours' actual practice in the chemical and pharmaceutical laboratories, while lasting proficiency and substantial reliability are certainly not attainable except through even still more extensive courses. But we ought not to overlook the fact that *what is practicable* may perhaps fall far short of *what ought to be*, for as a matter of fact the total laboratory practice *of all kinds* in fourteen colleges of pharmacy, attended by about two-thirds of all the pharmaceutical students, and including the oldest and largest institutions of this kind, averages less than 300 hours from matriculation to graduation.

THE GOVERNMENT OF STUDENTS IN COLLEGES OF PHARMACY.

BY H. M. WHELPLEY.

QUERY 23. Give a set of rules for the government of students at Colleges of Pharmacy.

Who does not remember the rules which were encountered during the school experience of our childhood days? Model indeed was the scholar who failed to look upon the precepts as a set of regulations to be studied and remembered for the sake of determining how they could be violated with the greatest annoyance to the teacher, and the least risk of punishment for the misdemeanor.

Pharmacy students are but grown-up children who feel that school days are exchanged for college work. They realize the independence of the change in life; for the majority of them have of their own free will elected pharmacy as an occupation. Should we, as teachers, not encourage this democratic principle? We are not schoolmasters tutoring children, but lecturers imparting knowledge to men and women.

I believe that the college catalogue should state in a few terse words that students matriculating assume the responsibility of ladies and gentlemen, and must conduct themselves as such during the entire college course; that any one forgetting his or her obligation is liable to expulsion and forfeiture of tickets.

Attention to the regulation of smoking should be given in colleges of pharmacy, as it is in all public buildings, conveyances, etc. Smoking should be confined to a smoking room, or entirely prohibited in the building. An observance of this law is a necessary precaution against conflagrations, as well as an act of common etiquette. This is the only order that I would advise to be posted in the main halls of the college building.

It is perfectly proper to have a set of rules for the students of each laboratory, and post the laws in the respective laboratory rooms. These rules need not cover principles of deportment, but serve as a system of discipline in cleanliness, system, punctuality, accuracy and dispatch.

Lecturers who have met with the perplexing questions of handling students who develop a mania for disturbances among their classmates may say that my theories are legitimate, but condition in place of theories must be dealt with by the College of Pharmacy professors. Permit me to say that I realize the pertinency of such suggestions, and will remark that individual cases should be dealt with as they arise. The Board of Trustees is the proper judicial tribunal of a college. Let that body bear in mind that a breath can extinguish a small fire, which, if permitted to burn, may become a mighty conflagration.

REPORT ON THE CONDITION OF PHARMACY IN THE PRINCIPAL COUNTRIES OF THE WORLD, AND ITS EDUCATIONAL, LEGAL, PROFESSIONAL, COMMERCIAL AND SOCIAL RELATIONS.

COMPILED BY ADOLF P'SON BERNHARDT, CHICAGO.

The following questions were submitted to U. S. Consuls and other qualified persons, in about two hundred different countries and principalities:

1. Laws and regulations governing the druggist's trade.
2. The requirements, educational or other, for obtaining license to practice pharmacy.
3. The number of druggists or drug stores.
4. Societies.
5. Colleges.
6. Classes of druggists.
7. Journals.

8. Economical and social conditions.

To these questions about fifty replies have been received as follows:

Europe—Austro-Hungary, Finland, Iceland, Italy and Switzerland.

Asia—British India, Burmah, China, Persia, Korea, Ceylon, Muscat and Sumatra.

Africa—Algiers, Egypt, Morocco, Mozambique, Orange Free State and Zanzibar.

Australia—New South Wales and Victoria.

America—Central: Costa Rica, Honduras, British Honduras. South: British Guiana, Ecuador, Bolivia, Peru and Colombia.

Islands—Leeward Islands, Turks Islands and Hawaiian Islands.

I shall endeavor to obtain information concerning the many remaining countries as far as may be possible.

AUSTRO-HUNGARY.*

There are two kinds of drug stores in Austro-Hungary:

1. Freiverkäufliche or Real Apotheken. 2. Personalgewerbe.

Freiverkäufliche Apotheken are such as can be transferred, sold, given away, and mortgaged by the proprietor to his children. Such drug stores must have been in existence before the year 1775, and even before that year been transferred by one owner to the other through sale, marriage, donation, etc., with the consent of the government.

2. Personal-Apotheken are such as can neither be inherited nor sold, and, therefore, cannot be mortgaged. Their license expires with the death of the proprietor, if he dies single; if he leaves a widow, she can continue the business as long as she does not marry again. Under *no* circumstances can the business be continued by the children. Only when he leaves a son, who has the proper education and necessary requirements, the same shall have the preference of other competitors.

Any one who wants to become a pharmacist must have passed the 6th class of the Gymnasium and then serve three years as apprentice in a drug store, after which time he has to pass a "Tirocinial" examination before a board of pharmacists. Having passed the "Tirocinial" examination satisfactorily, he enters an Austrian university as "extraordinary" student of Pharmacy. The course at the university is two years. To secure a diploma "the candidates" have to pass three different examinations, two theoretical and one practical. If the student successfully passes the examinations, he must take the oath and receives the diploma of "Master of Pharmacy" (Magister der Pharmacie). The diploma does not give him the power to conduct a pharmacy; he must yet work five years under a competent druggist; of these five years he is allowed to work two years in foreign countries. At the expiration of the five years he is allowed to conduct a drug store. Thus the requirements for conducting a pharmacy are:

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* There is a work "Oesterreichische Apoteker" containing the Pharmacy Laws, with remarks by Mr. Adolf Vomacka at Prague, which work can be obtained at any bookstore (for certain at Moritz Perks, Wien, Seilergasse).

Three years of apprenticeship, two years of study at the university, and five years of practice as "Magister der Pharmacie." Those fit for service in the army must serve one year more in a "Militär Apotheke."

The number of drug stores in Austria is 2860, of which 1377 are public stores, 30 filial or branch stores and 2 hospital drug stores.

The Pharmaceutical Corporations of Austria-Hungary:

1. Societies.

a. Austria.

1. The Austria Pharmaceutical Association (Oesterreichische Pharmaceutische Gesellschaft, Allgemeiner Oest. Apotheker-Verein, Wiener Apotheker Club, Wiener Pharm. Verein, Apotheker Unterstützungs Verein, Hygiea in Wien, Pharm. Krankenkasse für Ober Oest. und Salzburg, Deutscher Pharm. Verein in Graz, Steiermark—Grennal—Krankenkasse, Galizischer Apotheker Verein, Lemberger Club, Pharm. Verein "Unitas" in Krakau, Pharm. Verein in Cremnowitz and 4 Pharm. Vereine in Prag.

b. Ungarn. 6 Societies.

2. Gremien. 34 in Austria and 7 in Hungary.

There are a great many pharmaceutical journals, as: "Zeitschrift des Allgemeinen Oest. Apotheker Vereines," edited by Anton Sicha; "Pharmaceutische Post," "Zeitschrift für Nahrungsmittel Untersuchung," by Dr. H. Heger; "Rundschau für Pharmacie in Prag," "Czasipiomo Aptekarskie in Lemberg," and others.

The social condition of the druggists is an esteemed one, especially in the provinces. The profits of business are smaller than formerly, on account of the greater competition, the retail sales in wholesale houses, the diminution of the prescriptions, (donations) gifts to the doctors, the yearly shrinkage of the medicinal tax, etc. By properly conducting the business, in a small town, the druggist can make a living and save something besides.

During the last few years, a great many new drug stores were established. In any town, where there is no drug store within the circumference of fifteen kilometers, a druggist can, with the consent of the district judge, open a drug store. The district judge advertises for competition and gives the privilege to the successful competitor.

Many a poor "Magister," who is not able to pay the exorbitant price for a drug store, starts a "droguerie" (drug stores in which no prescriptions are allowed to be put up and no poison sold), which injures the regular drug stores. If there is need for a new drug store, it will be advertised, and the oldest "Magister of Pharmacy," who is recommended by the Board, receives the privilege from the district judge, but there is the possibility of somebody's appealing to the governor (Statthalter) and even to the Imperial ministry. The prices of drug stores are on an average in Vienna, 80–100,000 florins; in Krakau, 5,000; in the provinces the average price for a "Real Apotheke" is 3500–4,000 florins. Further information may be obtained from Dr. Hans Heger, "Pharm. Post," Wien I. Stefanplatz 8.

FINLAND.

Chemists' shops in Finland are of two kinds, viz.: "Stamapothek," or hereditary shops, which are the property of the chemists, and can be sold or bequeathed at their own pleasure, provided, however, that they are under the management of a person who has taken the degree of Provisor; and "personal" shops, which have been established since 1854, and are available only for the proprietor. These "personal" chemists' shops can likewise, by permission of the Medical Department, be sold, and have, in consequence, become of almost the same nature as the "Stam" or hereditary ones. Since 1890, however, the sale of "personal" chemists' shops at first hand has been prohibited. All privileges at present possessed by chemists' shops will continue in force until 1925, after which a re-adjustment of privileges will be made. Which principle—the hereditary, the personal or the free-trade—will then be followed is at present undecided, as each of them has its partisans. In places where there is so scanty a population that a regular chemist's shop cannot, or only with difficulty, be made to pay, a neighboring chemist is allowed, since the year 1869, to establish a "filial" or branch business. The regulations now in force for chemists are dated "Stockholm, Sweden, 12th Febr., 1799."* A motion to change these regulations, answering more to the requirements of the times, has lately been presented to the Senate, but is still awaiting the Imperial sanction.

The requirements for becoming a chemist are as follows:

1st. The candidate must have passed through six classes at a lyceum and served three years as pupil at a chemist's shop, before passing the examination of Farmacie Studiosus.

2d. Service during a term of four years as Farmacie Studiosus, in the capacity of laborant and assistant, in making up prescriptions. The candidate will then be entitled to present himself for passing an examination for becoming a Provisor. The course for the Provisor-examination may be completed in one or two years, according to diligence and previously acquired knowledge.

There is no special college for this purpose, but the examinations for provisor and chemist are made by professors at the Imperial Alexander University in Helsingfors, Finland, and by the Assessor of the Medical Department. In the year 1891 an application was made to the Senate for the building of a pharmaceutical laboratory.

Provisors, who in the examination have taken the degree "laudatur" or "cum laude," are, without further ceremony, acknowledged as chemists;

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* At that time Finland was a province of Sweden.

but those who have taken a lower degree must pass yet another examination before they can be entitled to receive a certificate as chemist.

Medicines are free from custom-house duty. Chemists are not allowed to carry on medical practice. Only prescriptions written by physicians duly legalized in Finland may be made up. A list, giving the names of the legalized physicians and of the doctors entitled to practice medicine, belonging to the Russian troops, quartered in this country, is annually sent to all chemists in Finland by the Medical Department.

Any chemist charging more than the medical tax forfeits his certificate.

The present edition of the "Finnish Pharmacopœia" was published in 1885; there is, besides, a separate military and veterinary pharmacopœia.

Inspection of chemists' shops is made once a year by the district physician, and at intervals by the medical department.

A new apothecaries' tariff is published every year by the medical department. Since the 14th of February, 1888, the sale of drugs is allowed to be carried on, but druggists are not allowed to sell compounded medicines, and of single drugs no smaller quantity than 150 grams. A separate ordinance respecting the trade in poisons was published on the 16th of April, 1889. The regulations for the "Finnish Pharmaceutical Association" were sanctioned on the 16th of April, 1889.

"The Pharmaceutical Advertiser" is the name of a publication in the interests of pharmacy. The Pharmacists Pension Fund in Finland was instituted in 1864, and has now increased to 617,268 Finnish Marks.

The economical and social position of the Finnish chemists is in general good. Nevertheless, the all-too-liberal distribution of personal, unsalable chemists' privileges of late years, already shows its effect in the difficulty experienced by intending chemists in obtaining credit for setting up their shops.

The smallness of the income in country places also compels the chemists, in spite of the strict control, to try to improve their circumstances by quackery and illegal trade in spirits.

The number of chemists' shops in Finland is at present 136; out of these 34 are "stam" shops, *i. e.*, such as can be sold and purchased.

Of druggists there are only 4.

Helsingfors, 1893.

GREECE.

Permission to open a pharmacy is given by the Minister of the Interior to graduated druggists, after previous deliberation of the administrative authorities and the medical board. One (1) pharmacy is allowed in a community of 1,000 persons; two (2) in a community of 3,000–6,000; in towns of 6,000 to 30,000 inhabitants, the proportion is one (1) pharmacy to every 3,000 persons; in towns of over 30,000 inhabitants, there may be one (1) pharmacy for every 4,000 persons. In the populations of towns are also included the populations of villages at a distance of an hour from them. Pharmacies must be separated from each other by 150 metres in cities, 60 metres in villages.

Only pharmacists and drug merchants are permitted to sell drugs. The latter can sell only in large quantities, and prepared drugs not at all. Industrial dealers can sell only those kinds of drugs which are used in their industries.

Pharmacists are not allowed to own more than one pharmacy in the same town. After fifteen (15) years practice, a pharmacist may pass over to another graduated pharmacist his establishment, himself giving up his business in that town.

Candidates for admission to the School of Pharmacy in the National University must produce: (1) a certificate showing that they have completed the course of study in one of the gymnasia of Greece, or in some institution of equal rank with the Greek gymnasia; (2) a testimonial from the local authorities showing that the candidate, after completing his studies in the gymnasium, has been apprenticed for at least one (1) year in a recognized pharmacy, and that he has gained sufficient knowledge of the mechanical part of pharmacy. Before admission, he is also subjected to a practical examination.

The course of study in the School of Pharmacy extends over three (3) full years. Students who have studied the science for three (3) years, and have passed successfully their examinations, may come before the medical board for their practical examinations. They must, however, present a certificate showing that, after taking their degree, they have again had six (6) months practice in a recognized pharmacy.

Those who succeed well in this examination, are granted the general license to practice; those who pass, but not so well, receive a license to practice in some borough of the third class; those who fail are rejected.

Drug merchants are those who are not permitted to put up medical prescriptions, but can sell only in quantity. They are graduates who have not been granted permission by the administration authorities to open a pharmacy, owing to the deficient number of inhabitants, and because the number of pharmacies allowed to be established in such places is already complete.

A "Pharmaceutical Review" (Φαρμακευτικὴ Ἐπιθεώρησις) is published at Athens by Mr. Leontides. The editor is Mr. Anastasius Damberges.

Most drugs are imported from other parts of Europe. There are two (2) chemical manufactories in Athens, which produce comparatively small quantities of drugs.

In *Athens* there are 34 pharmacies, and 28 establishments of drug merchants. Figures for all of Greece cannot now be given. Mr. Barouchas is President of the Athenian Pharmacists' Club (Φαρμακευτικὴ Ἑταιρεία). The School of Pharmacy in the National University at Athens, is the only School of Pharmacy in Greece.

Athens, 1893.

ICELAND.

There are only four druggists on the whole island, and these are governed by the same laws and regulations as those of the Danish kingdom.

I shall only add that the physicians in Iceland, when not in these four mentioned places. always keep their own apothecary store, and under no condition are they allowed to buy medicine outside of the island.

Dyrafjord, Iceland, October 2, 1893.

ITALY.

1. Laws and regulations of the Kingdom of Italy governing the druggists' trade.

To open or conduct a pharmacy in the kingdom of Italy it is necessary to hold the university diploma of pharmaceutical chemist (Chimico Farmacista). Formerly there were high class and low class diplomas, but the possessor of the latter could only open a pharmacy in *small* provincial towns or act as assistant with a duly qualified chemist.

When the Italian government passed the new sanitary law they provided for assistants who were not qualified in any way, by a practical examination, something like the English "Modified," but this diploma only authorized them to practice as assistants.

In 1892 the Pharmacopœia for the kingdom of Italy was issued. This contains all the regulations covering the practice of pharmacy:

A series of poisonous substances are obliged to be kept in a locked cupboard and the key held only by the director of the pharmacy. Chemists cannot sell poisons without a physician's prescription. Even those required for the arts can only be sold to persons known to the chemist or presented to him by an acquaintance of his. In both cases the sale has to be registered in a book kept for that purpose.

The Pharmacopœia also contains the tariff for retail of those drugs and chemicals mentioned in it, which are, however, rather few and chiefly ancient.

Pharmacies are liable to government inspection at any time, and if not found in perfect order the chemist is amenable to fines varying from 20 frs. to 300 frs., or even to have his license suspended.

2. The requirements (educational or other) for obtaining license to practice pharmacy?

Five years at an elementary school, comprising Italian language, Italian grammar, writing, arithmetic, geometry, history, geography and drawing.

Five years at a gymnasium—Italian, Latin, Greek, history, natural history, mathematics and geography.

Two years at a lyceum—Italian, Latin, Greek, history, natural history, mathematics, physics, philosophy and elementary chemistry.

Three years at a University—botany, materia medica, mineralogy, physics, chemistry, general and pharmaceutical, and quantitative analysis.

One year of practical pharmacy under the tuition of a duly qualified pharmacist, after which the student can present himself for examination for the diploma of pharmaceutical chemist.

3. Number of druggists? In the Kingdom of Italy there are 10,430 pharmacies.

4. Societies, ten.

5. Colleges, two.

6. Classes, now only one.

7. Journals, nine pharmaceutical and four chemical.

8. Economical and social condition, much the same as in England.

Rome, 1893.

SWITZERLAND.

In Switzerland, the drug business, except the examinations for it, is not regulated by one uniform law, but by the administrations of the different Cantons, if they meddle with this affair at all. The medical laws of the twenty-two Cantons and the regulations covering or regarding the drug business are independent and more or less different from each other. In the Canton of Glarus there is no law of this kind whatever; in several other cantons, again, these provisions are very imperfect and limit or modify the sale of poison only.

For the privilege of being permitted to practice the drug business, the following requirements are made:

a. Graduation from a gymnasium (or college) or a certificate of having acquired the same grade of the so-called humanistic education which these colleges attain.

b. A course of studies of two years with one or several druggists holding diplomas of Switzerland.

c. An examination showing the qualification of an assistant.

d. At least one year of employment as an assistant by one or more druggists.

e. Four terms of studies in some university or polytechnic school at home or abroad.

f. A Swiss diploma obtained on account of having passed an examination before the board of examiners of pharmacists—state examination. This examination can be taken at Basel, Berne, Lausanne and Zurich.

These requirements are demanded in all Swiss cantons except Genf, where also foreign diplomas are acknowledged. In Appenzell-Ausserrhoden and Glarus no diplomas are necessary to obtain permission for practicing the drug business.

Drug stores, the possessors of which have no Swiss diploma or have died, must, in some cantons, be administered by druggists holding such diplomas. The permission to open a new drug store depends—besides the diploma—on the favorable result of the inspection, and is granted officially either by the government or by some board of health (pro forma only). In several Cantons this formality and even the inspection or visitation does not exist.

There is no such thing as a directory in Switzerland, because this is a matter concerning all the Cantons.

There is a Swiss association of druggists, numbering about 20 honorary and 310 active members, who meet once a year for a session lasting two days. Local unions exist in the Cantons of Aargau, Basel, Bern, Genf, Neuenburg, Tessin, Waadt, Wallis and Zurich.

The pharmaceutical studies can be pursued at the universities of Basel, Bern, Genf, Lausanne and Zurich, and the polytechnicum of Zurich.

The only professional paper existing in Switzerland is: Die Schweizer Wochenschrift für Chemie und Pharmacie, etc. (The Swiss Weekly for Chemistry and Pharmacy, official organ of the Swiss Association of Druggists and of the Association of Swiss Analytical Chemists.) Editor: Fr. Seiler, etc., etc.

Because the druggist, before being admitted to apprenticeship, is required to pass the final examination of a college, he stands educationally as high as all others being engaged in the so-called learned professions; socially he ranks with the physician, and, consequently, he is often elected to some public office in the parish as well as in the State.

The privilege of putting up prescriptions, a certain part of the retail drug business, and the sale of poison, are exclusively in the hands of the druggist except in places where, as in rural districts and some cities, the physicians, also, put up prescriptions.

Dealers in drugs, except in the Canton of Glarus, are not allowed to put up prescriptions, to do a certain part of the retail business, or to sell poison.

The prices for medicines are different in every Canton. Some Cantons have tariff rates approved by the government, others such as are recommended by a convention of druggists or by a physician of a Canton, and some again have none whatever. The last two cases, however, concern the retail business chiefly.

Regulations for the sale of secret remedies, although there is a deplorable abundance of them, do not exist; a few Cantons, however, excepted.

The number of pharmacies in Switzerland is about 500, most of which are public, but some are hospital dispensaries. In addition to that there is one co-operative pharmacy in Genf (Geneva).

There is but one class of apothecaries and but one kind of diplomas in Switzerland.

Basel, 1893.

BRITISH INDIA.

1. The laws and regulations governing the drug business are very few or none, all houses of any standing employing a doctor.

2. The requirements, educational or other, are merely nominal.

3. There are no societies.

4. There is no directory of druggists.

5. Of colleges, there is the Campbell Medical School for Apothecaries. This school gives license, but the requirements are of the most meagre description.

The business is in the hands of a few old English firms who have been here many years. There are also some very large native firms whose business is entirely with native dealers up in the country. The business is not organized at all as it is in the United States or Europe. The leading firms here (Calcutta) are Bathgate & Co. and Scott Thomas & Co

Calcutta, 1893.

An article headed "Round the World," written by Mr. S. V. Morgan and published in "The Chemist and Druggist" of April 29, 1893, gives a summary of the condition of pharmacy in different countries, including Burmah and India. What applies to India will also apply to Burmah, as the regulations, or rather want of regulations, that govern the drug trade, are the same in both countries.

Burmah is not yet blessed with a Pharmacy Act, nor are there otherwise any restrictions placed upon the sale of poisons. It consequently follows that any one who chooses, may without license or educational attainment open shop, style himself chemist, pharmacist, or other misleading title, and sell all the poisons in the Materia Medica.

Notwithstanding this, the European pharmacies in Burmah are mostly conducted by persons holding the qualification of the Pharmaceutical Society of Great Britain.

The following is a list of the principal druggists' shops in the two chief towns of the province :

Rangoon—Dover's Medical Hall, 63 Merchant street. Druggist's Hall, Sule Pagoda Road. De Souza & Co., E. M., 215 Dalhousie street. Housie & Co., Merchant street. New Medical Hall, Phayre street. Oriental Medical Hall, Dalhousie street. Provident Dispensary, 10 B. Dalhousie street. Rae & Co., R. S., Apothecaries' Hall, Warwick House. Rangoon Medical Hall, Barr street. Rangoon Pharmacy, Dalhousie street.

Mandalay—Mandalay Medical Hall. Curtis & Co. Burmah Medical Hall. Town Dispensary.

As to pharmaceutical schools or colleges, there are no such institutions in Burmah.

Rangoon, 1893.

CHINA.

1. "The druggist's business in China is not subject to governmental regulations ; in fact, those holding jurisdiction pay no heed to it in the interest of the subjects' welfare. However, persons entering into that business almost always join themselves into a guild or consolidated body,

which facilitates their transactions with the wholesale dealers in their line and secures to them privileges not accorded to non-members.

2. "Deadly poisons are generally refused to unknown purchasers, women and youths; but the sellers are not held responsible for any fatal or criminal result.

3. "No license to practice pharmacy is required or obtainable. Proficiency is acquired by apprenticeship, with no specification as to the duration of the latter, which depends entirely on the apprentice's natural capability and previous knowledge of reading and writing.

4. "The Business Directory is a thing unknown to Chinese druggists, or even to merchants in general. The substitute usually adopted, and which answers more or less the purposes of a Directory, is the posting of handbills in every available nook and corner.

5. "The societies or 'guilds' above referred to are purely local institutions each city having its own. They are not founded with any idea of promoting the science of pharmacy, but their sole objects are confined to securing to their members certain commercial advantages, and affording them protection when engaged in litigation springing from the practice of their profession. Colleges or schools of pharmacy of any grade are wholly unknown among the Chinese. A Chinese pharmacist is not considered a professional man; he differs from an ordinary mercantile clerk chiefly in that he possesses a small vocabulary of the botanical names of medicinal herbs, and the preparations made from these constitute his principal stock in trade.

6. "The standing of a particular pharmaceutical establishment depends upon the quality of the drugs supplied, which in turn is largely proportionate to the wealth or poverty of its *clientele;* the price rising in exact proportion to the purity and freshness of the articles demanded, and the adulteration of drugs and even the substitution of spurious imitations being frequently practiced in order to meet the demands of the poorer classes for a low-priced article."

Hong-Kong, 1893.

KOREA.

1st. There are no laws in Korea regulating the drug business.

2d. There is no law prescribing the qualifications necessary for the practice of pharmacy.

3d, 4th and 5th. There are no directories, colleges or schools for pharmacy here.

6th. As to the social and economical conditions I may give the following general information:

Any native doctor may establish himself in the drug business. These doctors are not educated in any special school, but all men of education are supposed to be familiar with the treatises on medicine. If one such wishes to adopt medicine as a profession, he does so without license. He merely perfects himself more fully by a closer study of the books on the subject and by contact with other successful practitioners. Success is measured by the degree of skill displayed.

Custom is quite as binding here as law, and it is the well-accepted custom that no poisonous medicine shall be sold except upon the written prescription of a regular doctor. If a person is so foolish as to employ an ignorant medical man, he takes the risk upon himself. In the case of a man of education treating himself from the books, the druggist assures himself that the man wants the dangerous drug for medicine rather than for poison, and that he knows how to use it. If, however, the purchaser comes to grief through its use, the dispenser is not punished.

I may say that drug shops are quite numerous and the supply of remedies is extensive, being much the same as is found in China, comprising many with which we are familiar, and not a few that we do not, or would not, prize. Suicides by poisoning are not so common as in China. Opium is not used here. The custom above referred to seems strong enough to prevent frequent mistakes, and, in spite of the crude methods, the native practitioners sometimes get very good results.

The drug shops are not, of course, supplied with the array of highly poisonous remedies found with us. Their medicines are usually used in the crude form as infusions or decoctions. While "mental medication" in the carrying out of certain superstitious beliefs forms no unimportant part of the native pharmacopœia, and detracts from the business of the regular druggist and practitioner, it supports another quite different class: the blind magician and the dancing female spirit-soothers.

Seoule, 1893.

CEYLON.

There is no law here whatsoever governing the druggists' trade. No license is required for the practice of pharmacy or medicine; any person can, at his or her own discretion, practice medicine or sell drugs here without any sort of license.

Colombo, 1893.

MUSCAT.

This country is very backward and low down in the scale of civilization. There are no druggists in business here, and if there were it is questionable whether or not the people would patronize them. No license would be required to practice pharmacy. There are consequently no journals and no colleges.

The people are Mussulmans and get native medicines from their Moullahs. The British Indian Government has established a free hospital and dispensary here, but British Indian subjects chiefly patronize it.

Muscat, 1893.

SUMATRA.

There are no licensed druggists, the trade in drugs being carried on by Chinamen, who deal mostly with their own people. There are no laws or regulations concerning the trade, as far as is known.

Padang, 1893.

PERSIA.

The only institution where pharmacy is taught is at the Shah's College in Teheran. The American mission stations located in several towns and districts afford instruction in the dispensing of medicine in a more thorough manner than at the Royal College. The medical officers connected with the missions have had practical and scientific training at home, while in the college, on the contrary, more attention is paid to the ancient system of medicine and therapeutics as descended from the Arabs and Greeks, in fact most of the text-books being in the Arabic language. The Persian system has never got beyond the state of empiricism, and the remedies are confined to a few well-known herbs and fruits. The remedies are divided into two great arbitrary classes, *hot* and *cold*, and they are applied as the malady may indicate one or the other of these two divisions. Hence no very great amount of knowledge is necessary to qualify a man to dispense medicines or be a druggist in Persia.

There are no laws or restrictions or demand of special qualifications. This is explained by the fact that no poisonous drugs are ever used, the strongest, opium, only being applied externally, and for this reason quite young lads are intrusted with the dispensing of prescriptions.

The trade pays a small tax to the government, amounting to about 600 dollars annually for all the dealers in Teheran, a city of 200,000 people. This tax is apportioned by a council elected by the trade, for each dealer in drugs who also handles other articles such as tea, coffee, sugar, tobacco, etc.

The council elects a chief or head, and it is his duty to visit the different shops and to see that its very simple rules are observed As the penal regulations (the unalterable Icelandic law is quite different from our codes) are by no means stringent, even in cases where serious consequences are the result of ignorance or carelessness, the culprit generally gets off with a small fine. As, however, some protection is necessary where opium and the *sublime corrosif* are kept, the council orders that these poisons shall only be sold to men known to the seller, and that they shall not be given to women or children without either a doctor's certificate or on the testimony of some known person. These rules are, however, very frequently broken, and poisons are supplied to both women and children.

At the present time there is no directory published in Persia in relation with this or any other profession, and this is equally true in regard to journals and societies devoted to any particular trade or profession.

The only qualification at present absolutely necessary is that the dispenser shall be able to read, write, understand weights (measures are not used) and be able to sell so as to make some profit. Native druggists or herb sellers never prepare or compound medicines, as that has to be done by the friends of the patients.

There is in Teheran a German druggist who sells, of course, European medicines, but he is under no law, except that of his own country, whatever. There are, besides him, a few natives who sell some of the simpler European drugs, but they are usually of an indifferent kind.

Teheran, 1893.

COSTA RICA.

There is no pharmacy law or other regulation concerning the sale of drugs, except that arsenic, morphine and strychnine must be sold only on a physician's prescription or upon the order of the governador (mayor) of a city or town.

There is an unwritten law that a druggist must not sell to exceed five cents' worth of laudanum to any one, and this is diluted one-half. This is probably on the assumption that so small a quantity can do no harm.

Carbolic acid and corrosive sublimate as insecticides, and oxalic acid for bleaching Panama hats, are sold in large quantities.

Pharmacy is regarded as part of a physician's practice, there being only one drug store in Costa Rica not owned by a physician.

Native drug clerks have a very superficial knowledge of the business, and seem to be so perfectly contented with their ignorance that when I operated a store in Cartago a few years ago, I had to obtain help from the United States. There are no pharmaceutical schools or societies. Very few patent medicines, sundries or fancy goods are sold.

San José, the capital (25,000), has 10 drug stores; Cartago (10,000), 5; Costa Rica (250,000), has not more than 30 drug stores all told.

Grafton, North Dakota (formerly Cartago).

BRITISH HONDURAS.

1. We have no laws governing the trade of a druggist. A law is in force relative to the sale of poisons, but this refers to any one selling poisons.

2. No requirements are necessary to sell drugs nor compound prescriptions given by duly qualified medical men.

3. There are only three drug stores in this town, none in any other part of the colony.

4, 5 & 6. None.

Belize, September 7, 1893.

HONDURAS.

1. The Honduranean law requires the druggist to pass an examination before a Board of Pharmacists, who are usually physicians; any accredited physician can practice pharmacy.

2. I cannot give you the number of druggists in Honduras. I think there are six drug stores in this city.

3. There are no societies.

4. There are no colleges.

5. There are no journals.

6. As to the "economical and social conditions," the large majority of the people are very poor, and live very poorly.

Tegucigalpa, November 13th, 1893.

COLOMBIA.

No regulations governing the drug business. Any one having money to buy drugs, "poison and all," can open a shop and place a ten-year-old boy behind the counter to deal out arsenic instead of soda. There are consequently no societies or journals. Everything is a "go-as-you-please."

Barranguilla, 1893.

BRITISH GUIANA.

There is a law pending concerning regulations of the drug business.

There is a society with some fifty members at Georgetown, Demerara, which also gives instructions in pharmacy, and membership is acquired only through the society's examination board.

The Colonial government exacts an import duty of $4.00 per pound on opium, but there are no restrictions on its sale. American patent medicines are largely used, and if non-alcoholic are duty free.

Demerara, 1893.

BOLIVIA.

The law regulating the practice of pharmacy was enacted in 1846. To practice pharmacy in the Republic it is necessary to have a diploma from the government. To obtain such diploma the candidate must prove that he has attended a graded four-year course, including all the natural sciences, and practical chemistry, and pharmacy, and pharmacology, and passed the annual examinations satisfactorily at one of the national universities, and obtained the diploma of bachelor of sciences. A candidate having studied outside of the Republic must pass prescribed examinations. Upon passing a theoretical and a practical examination before Protomedico, the candidate presents himself before the National Government and receives its diploma, which is a license to practice pharmacy. There are from 30 to 40 pharmacists with diplomas. There is no society. Universities at La Paz, Cochabamba and Sucre. There are no journals. The economic conditions are not very good, perhaps because of the climate and the fact that the native Indian race does not use medicine much. The druggists assay ores, etc., for the government, and a druggist is a professor in the university at La Paz. Although the business is not very profitable it is very honorable, and the druggists associate with the best of the people.

ECUADOR.

1. No private individual or druggist can deal in drugs or medicinal products without the permit from the corresponding "Municipality," providing the investigation made by a commission composed of able persons, appointed by the Central University of the Republic or by the Board of Directors of the University of Guayaquil and Cuenca.

2. For practicing pharmacy it is necessary to have at least the title of "Licenciado on Farmacia," at present given only by the Central University of the Republic.

3. The number of druggists is, more or less, 80 in the Republic.

4. No societies.

5. Colleges, one in Quito, a branch of the "Instituto de Ciencias Naturales."

6. Here are no Doctors of Pharmacy, all are "Licenciados."

7. No journal published in the Republic.

8. The drug and medical business is very little extended in proportion to the number of drug stores, which are over 100 in the whole Republic.

Guayaquil, 1893.

LEEWARD ISLANDS, W. I.

There is no regular pharmacy; one small drug store at St. Bartholomew. The island is French and under the jurisdiction of the Guadeloupe government.

TURK'S ISLAND.

There is no regular druggist established and it is doubtful if one could be supported. The government medical officer dispenses his own medicines.

HAWAII.

There are no laws or regulations except that the sale of poisons must be registered and the sale of opium and its preparations is forbidden. Physicians do most of their own dispensing.

There are three drug stores in Honolulu, two of these being wholesale and retail, one exclusively retail. These are all owned by Americans and conducted on the American plan—Benson, Smith & Co., carrying a large stock. The U. S. Ph. is the recognized authority, although the British and German Pharmacopœias are also used.

Honolulu, 1893.

PERU.

1. Laws and rules of the Republic of Peru regarding the drug trade. There is in this republic a distinct difference between a wholesale and a retail drug store (Drogueria y Rotica). The wholesale drug stores (Las droguerias) are importing houses of all kinds of articles sold in pharmacies or of pharmaceutical origin; they sell in quantities, more or less large, especially to the retail druggists.

For conducting these establishments it does not require any diploma of a special study; anybody can conduct the business being only subject to the general laws of commerce and to an annual inspection by the medical faculty (de la Facultad de Medicina) for examining the quality of goods that are sold.

There are in Lima three of these establishments: Hagae y Castagnini, A Rigon y Serra y Barbera and some other houses, although these do not deal especially in drugs; however they import some drugs in quantities and sell them on the same conditions as the wholesale drug stores.

These firms are: Ladovvieg & Co., D. Molfino & Co., C. Mombello & Co., Nosiglia Hermanos, Rossel & Co., and some others.

The retail drug stores sell generally medicines only in small quantities; it is required that they are directly conducted by a pharmacist with diploma. There are in Lima thirty-nine pharmacies; of these six import medicines and sell also at wholesale. These are: J. Meyer, Gallese & Co., Signone & Velasquez, Joan F. Remy, Emilio T. Grec and Aguiles Boggiano.

The laws and rules to which these establishments, as well as the ones who sell only at retail, are subject, are enclosed. In some departments there are drug stores which import their own medicines.

2. The education that is required for obtaining license to open a drug store, that is to obtain "titale de farmaceutico" the title of pharmacist: To go through a preliminary instruction, literary and scientific, and to obtain a diploma that is called "Aspirante Universitario," and also to pass two examinations, one oral and one written, after devoting two years to study ("De Ciencias naturales de la Facultated de Ciencias") (physics, chemistry and natural history). Having secured a certificate of having passed the examination satisfactorily, he must devote four years to theoretical and practical studies in a drug store (natural history, chemistry, physics in reference to pharmacy, analytic, qualitative chemistry, materia medica and pharmacy).

3. The number of druggists who sell at wholesale are 12, and the retail druggists are 140.

4. There is one society at present, started June 11, 1893, under the name "Sociedad Farmaceutica."

5. There is not any special College of Pharmacy; the studies are pursued at the medical college (la Escuela de Medicina). There is no academic degree for pharmacists, only the acquisition of a diploma, which entitles them to practice pharmacy.

6. As will be understood by the above, there is not any technical distinction between these two classes of druggists; they have the same rights and duties before the correspondent authority (Facultad de Medicina), and commercially the wholesale drug stores are of the same kind. For revenue purposes the retail drug stores are classified into four classes according to their respective commercial standing.

7. "La Sociedad Farmaceutica" has commenced to publish a monthly journal under the name of "La Farmacia Peruana."

8. In regard to the social conditions, they are not very favorable as a general rule; however, some of the druggists have high positions in the administrations, as professors, etc.

As to the economic conditions, the retail pharmacists are more or less in the hands of the business men. The firm of I. Meyer has a laboratory for manufacturing pharmaceutical products which is constantly being extended.

Lima, 1893.

ALGIERS.

1. Laws and regulations of Algiers (viz.: Algeria), governing druggist or chemists' trade are exactly the same as in France.

2. Requirements for obtaining license and practice also like France.

3. Druggists about 200, of which 32 in Algiers, the principal town.

4. Society. Algiers includes three provinces, Algiers, Constantine, Oron, each having had some years ago a chemists' society. One only, the "Syndicat des Pharmaciens d'Alger," is still existing, with some 45 members (chairman, M. Chavot; secretary, M. Isnardi; treasurer, M. Knoertzer). A few chemists from the other provinces also belong to this. A movement has been started to group all chemists of the 3 provinces in one alliance, the Algiers society being considered as the nucleus of the whole.

5. Journals. The "Syndicat" publishes a yearly record, called "Procès-verbal de la reunion generale," relating to professional news, but not scientific works.

6. Colleges. There is an "Ecole de medicine et de pharmacie," in Algiers, where about 10 or 12 chemists of the second class take their degrees every year. The students, candidates for the first class examinations, have to pass these in some "Ecole superieure" in France. Most of them go to Montpellier, the nearest of all.

7. There are about 20 first-class chemists in Algeria; in fact, like in France, the only practical difference between the two classes is that the second class chemists cannot be members of the jury for examination.

8. Economical and social conditions. Considering the preponderancy of the number of the native inhabitants who do not deal with European chemists, but have their own quacks and medicines, it is a fact that chemists are too many in this country. The business hardly allows them to get their livelihood, at least in most of the cases. And, moreover, in spite that there is no want of chemists, the school produces every year ten times more than the steady increase of inhabitants makes necessary.

A few of them, in the larger cities, enjoy a better trade. The result of this precarious situation is that businesses are often sold, but seldom to the satisfaction of either seller or buyer.

Another important reason of the present depreciation of the trade is the "quinine" question. Many parts of the flat country are feverish, and quinine is therefore to chemists the most important article.

Lately, in order to allow the country people to get quinine in a cheap way, the authorities have bought it from makers and sell it at cost price. It is against the law, and does immense harm to chemists. However, social conditions are better than economical.

Chemists are in this country, like in France, considered persons standing on same line as medical men, being often selected as mayor of their village, at least as members of the town council. In Algiers two of them are members of the jury for chemists' examination.

Algiers, 1893.

EGYPT.

The laws of Egypt, in regard to the drug business, are very much the same as those of France. An exception, however, is that the price of medicines in France is governed by law, whereas in Egypt this is regulated by circumstances.

For conducting a drug store in Egypt it is necessary to have secured a diploma. This, however, does not imply the obtaining of an individual diploma, as in France, Germany, and probably the rest of the European countries; it is here sufficient to have the necessary amount of money for obtaining a local license and starting one or more drug stores—which, of course, renders the position of a truly qualified druggist somewhat embarrassing. The total number of Egyptian druggists may be estimated at about 200. The city of Cairo may have about 60 and Alexandria nearly as many; the rest is scattered in smaller towns and villages.

In Cairo and Alexandria most drug stores belong to Europeans, and, it may well be said that one-third of these are profoundly educated druggists, who hold first-class diplomas and secure to the public the benefit that a solid, scientific and practical education can offer. Another third are persons that hold diplomas by favoritism only; and the last third, it is safe to say, are persons possessed rather of wealth than experience and training, who, by means of their wealth, carry on the drug business by engaging a licensed clerk on whose shoulders they shift all responsibilities.

This class of druggists will concern themselves about their business only in so far as to call monthly to "pocket" the profits.

It is thus apparent, that by the carrying on of the drug business in this manner, the public receives no substantial guarantee, to which it is surely entitled. However, the public is rather indifferent to this; all it cares for is to get the cheapest and the most for the money; believing, that since the government has granted such persons the right to carry on business, all must be correct. On this account, it is surely impossible to bring all druggists to a closer relationship, as the more respectable will shun the company of the others, and again the latter will care very little for the former, because they know themselves to be in the majority. If we further consider the various nationalities (for Egypt is indeed a very cosmopolitan country), it is fully apparent that it is next to an impossibility to bring the various drug clerks to a solid brotherhood.

It is well to say here that Egypt has no scientific, medicinal or pharmaceutical journals. The few technical journals that some European doctors have attempted to publish, have been a complete failure.

In all Egypt we find but a single medicinal and pharmaceutical college; it is located at Kase-el-Aini, and the language in use by instructors is the Arabic. The professors belong to various nationalities—Arabs, English and French—but all lectures are held in the Arabic tongue. To gain admittance to this college it is necessary to understand Arabic, English and French.

Three years' study is required for obtaining a diploma as pharmacist (Maitre en Pharmacie). The first year of tuition comprises physics, inorganic chemistry and mineralogy. The second, botany, organic chemistry and zoölogy. The third, pharmacology and medical studies (Matierė Medicale). At the close of each year the students are examined, and at the end of three years each student receives his diploma, provided he has honorably passed the examination.

There is but one grade of diploma, though it was customary some years ago to grant some favorite students a preliminary diploma, which, however, was confined to cities only. This step led to many misuses and has been abolished. It may further be stated that about fifteen or twenty years ago a druggist in Egypt had every reason for thinking himself able to retire from business after a lapse of some years, which to-day is wholy impossible to think of, as there is no special tariff governing the sale or purchase of medicine, which policy has had in store an excessive amount of opposition. There is in fact no particular inducement offered to any one to engage in the drug business.

As an illustration, Cairo, a city of 600,000 inhabitants, has 60 druggists, thus 10,000 to one, which would seem to us rather inviting. But, if we consider the enormously high rent paid here, as well as the higher salaries paid to clerks and other impediments, we will soon understand that "all is not gold that glitters." As to the social influence of the druggists of Cairo, I cannot say they do enjoy any more respect, than any other dealer in town. And why should he enjoy any more distinction than anybody else engaged in dealing? The druggist here is nothing else but a small "vender" that sells his wares somewhat like any other merchant.

In Cairo and Alexandria we find some honorable exceptions, but even these excel not any of the European or American colleges of mediocrity. For most of the druggists, pharmacy is nothing else than to make up a doctor's prescription and "pocket" the money for it.

Concerning the practice in drug stores, I beg to say, as Egypt is a cosmopolitan country, it will take a considerable time for any good druggist to make himself useful among this heterogeneous people; he will have to acquaint himself with German, French, Italian, English and American customs and traditions.

The knowledge of the metric system and the old system of ounces is necessary, as well as of the pharmacopœias of the different countries. Every druggist here is expected to speak English, French, German and Arabic, and it is to his advantage to also speak Italian and Greek.

The lot of an Egyptian druggist is anything but enviable, as he is bound to endure more hardships, morally as well as materially, than in either Europe or the United States of America.

ORANGE FREE STATE.

Apothecaries.

Chapter XCIV. of the Orange Free State Law Book, re Committee of Apothecaries.

1. Any person who has been contracted as apprentice for not less than four years to an admitted physician, apothecary, chemist or druggist, and has attained the age of twenty-one years, may be admitted by the State President to practice as chemist, apothecary or druggist in the State, but not before he has obtained a certificate of qualification from a committee of three who are appointed by the President to examine such candidate.

2. The contract of apprenticeship, or a certified copy of same, must be deposited with, and registered by the Registrar of deeds, according to law, not later than one month from date of examination.

3. For such examination each candidate has to deposit with the committee before the examination the sum of $14.40 (£3), and each admission must be covered by a fee of the same amount.

4. Any person who has already been admitted as apothecary, chemist or druggist in some other country, or who has passed any examination as such in some foreign university or other acknowledged institution, and wishes to be admitted in this State, shall be obliged to apply to the committee mentioned in § 1, which committee shall examine his documents, etc., and, if found necessary, to put such candidate to the test by another examination.

5. The provision in § 2 and 3 shall also be applied to persons mentioned in last named §.

6. Physicians may have their own dispensaries, providing they pay the license fee according to tariff. Such admitted physician may either serve himself in such dispensary or be assisted by an admitted apothecary, chemist or druggist.

7. Such admitted physicians and persons falling under § 1 and 4, admitted, may lawfully execute their duty after having taken out a license as described by law.

8. Any person who, according to stipulation of this chapter, shall have been admitted and trespasses any one of these articles shall, upon proof

before the magistrate's court, be fined to pay a sum not exceeding $250, or in case of non-payment imprisonment for three months.

9. The stipulations contained in sections one and two are not to be applied to the existing contracts prior to the 12th of May, 1887, or scholars apprenticed before that date, to admitted physicians, apothecaries, chemists or druggists, providing a document in writing is drawn up of such apprenticeship not later than three months after the 13th of May, 1887; mentioning, amongst other particulars, the time such apprentice has already served, and which document must be deposited with and registered by the Registrar of deeds.

The cost of license for an admitted apothecary, chemist or druggist, with right of keeping a druggist shop, is $50 per annum.

1. There is no other law *re* druggist trade than the one about apothecaries.
2. Any certificate of German, English or Dutch schools is accepted.
3. Chemists are exempted from jury service.
4. Druggists are not divided into classes here.
5. There are no existing societies.
6. All journals are foreign circulation, none are printed here.
7. There is no college for pharmacy in South Africa.
8. The social condition of chemists, etc., here is anything but good, it being due to their belonging to so many different nationalities.

Bloemfontein, 1893.

MOROCCO.

Any person can open a drug store in Morocco, there being no laws in existence to govern the same.

The undermentioned are those who keep drug stores in Tangier: Mr. N. Dassoy, M. Jno. Blanes, Mr. Jno. Murillo, Mr. G. Serph, Messrs. Finas et Toltier, Mr. M. Montuatino.

Tangier, 1893.

MOZAMBIQUE.

The druggist's business is solely in the hands of the government, and no drugs or medicines are allowed to be sold outside of the government hospitals. All persons serving in these hospitals as apothecaries must be Portuguese subjects, and enrolled as apothecaries in either the naval or military forces of Portugal.

There are no druggist's directories, societies, journals, or colleges in this province, and the economical and social conditions of the business are similar to those of the Portuguese forces in Portugal and its other colonial possessions.

ZANZIBAR.

The laws governing the druggists' trade are very few. A license has to be obtained from the British Protectorate, owners and clerks must prove their competence by certificate or examination, and poisons cannot be sold except with the approval of responsible doctors. There are but three or four druggists. These are Germans and Portugese. There are no societies, journals, or colleges. Zanzibar ranks as a heathen country. The native blacks rely on their own medicines, herbs, etc. The Arabs and Hindus patronize the druggists but little.

Zanzibar, 1893.

VICTORIA, AUSTRALIA.

A law was enacted in 1876, and as amended in 1885 and again in 1890, requires:

Preliminary examination in Latin, English and arithmetic for registration as apprentice. After four years' apprenticeship with a registered chemist and after having attended one course of instruction (from February 1st to December 1st), and obtaining a certificate as having passed the examination at the University of Melbourne or other school recognized by the Board of Pharmacy, the candidate is eligible to a practical examination before the Pharmacy Board Examiners. If successful he is registered as a pharmaceutical chemist, with the right to practice pharmacy.

The Board consists of six members appointed by the Governor, who have been elected by the registered pharmaceutical chemists and registered chemists (in business prior to the enactment). The Board appoints examiners outside its own membership if necessary, from professors at the University.

The Board must publish a register annually, and death registrars must advise the Board of deaths of all pharmaceutical chemists and registered chemists, that their names may be stricken off. The Board may register pharmaceutical chemists of Great Britain and graduates of such other institutions as it may desire to recognize. Also, to give modified examinations to those in business previous to 1877, and to chemists employed in hospital dispensaries, etc.

The apprentice must be permitted to devote the last year of his four-year apprenticeship to study at the university at the risk of forfeiture of his indenture agreement.

The Pharmaceutical Society of Australasia established 1857, has some 300 members and a large honorary list, including the late Professor J. M. Maisch, of Philadelphia. It conducts a College of Pharmacy which has annually about 50 students, and as many more students from the medical department of the university.

The Society also publishes the Australasian Journal of Pharmacy at Melbourne, now in its tenth volume.

NEW SOUTH WALES—AUSTRALIA.

There is no pharmacy law, but a poison act of 1876, which confines the sale of poisons to pharmacists. The poisons enumerated in two schedules comprise nearly all active drugs and chemicals, so that it answers practically the same purpose as a pharmacy law. Other persons may be licensed by the Board of Pharmacy to sell poisons ; so may medical men.

The Board consists of the medical adviser to the government, the President of the Medical Board and the members of the Council of the Pharmaceutical Society, who select three or four qualified persons to act as examiners. The apprentice must be registered after a preliminary examination, and after three years' service is eligible to the examination by the Board examiners. Upon passing he becomes registered. The register comprises 600 chemists and druggists and about 50 medical men. Those who pass examination have the title, pharmaceutical chemist. The Pharmaceutical Society was organized in Sydney, 1887. It supports a School of Pharmacy and the Pharmaceutical Journal of Australasia, in its eighth volume.

A FEW WORDS ABOUT QUERY NO 8.

BY W. BODEMANN, CHICAGO.

The American Pharmaceutical Association should appoint an Agitation Committee, for the express purpose of asking every member and all Pharmaceutical State and local Societies to see that our Trade Mark and Patent Laws are changed. The American Pharmaceutical Association has been asked to do this repeatedly—but has never done a thing ; so the most appropriate answer to this query would be—get a move on yourself and do something.

It is well enough to patent a process of manufacture, but the manufactured article should never be patented.

No European country grants a patent on a manufactured article used in the healing arts. Take sulfonal ; there are about a dozen different patents on the process of manufacture of this chemical in Germany, but the article itself is not patented, and the result is that chemists never tire of discovering new ways of manufacturing such chemicals, and that opens the field of competition. Our country, however, bars the field of investigation by patenting the process, the article itself, and the name ; and in this way you must pay, and do pay, exorbitant prices. If this sort of "hold up and pay" policy is not modified, our materia medica will soon be completely chained up by Trade Mark and Patent laws. Enough has been said on this subject to make it clear to every member that something must be done, or in due course of events pharmacists and pharmacy will soon be owned by a small army of patentees and sole lessees.

If the American Pharmaceutical Association does not act on such urgent appeals as have been laid before its conventions, it would be a waste of words to try further to stimulate the Association into action. A committee should draft an appeal to every pharmacist in the United States, urging each and every one to exert himself with his Representative at Washington to have these monstrous laws changed. The committee should request every Association in the land to take up the fight—and I would make a formal motion, to have a Special Committee appointed that has authority and power to act, to agitate this question till these infamous laws are changed and so modified as to open up the field of investigation to competition, and cheapen the price of chemicals applied in the healing art. I leave this motion in the hands of the able Chairman of the Section on Legislation.

If the great superiority of German chemical science, theoretical and industrial, must be freely conceded, it is not less true that Germany has arrived at happy solutions of many practical pharmaceutical problems with which we are still wrestling. In no way is this fact more strikingly exemplified than in the German laws for the regulation of patents on new chemicals and medicaments.

No one needs to be told of the impositions which are practiced in this country under the protection of our absurd statutes with respect to patents. As long ago as May, 1891, the *Therapeutic Gazette* declared :

"The majority of medicinal patents have no real merit. Most of them represent absolutely nothing that was not previously known to science ; they are nuisances ; they do not contribute to general intellectual progress ; they discourage scientific investigations. . . . The only explanation that can be given of this lamentable state of affairs lies in the laxity and ambiguity of the present patent laws, and the almost puerile knowledge which they manifest regarding the history of chemistry in its broadest sense. *A medicinal preparation need not represent anything novel further than the new name.*"

The German patent laws are not quite so pliable and accommodating to ingenious gentlemen seeking new means of making money out of old ideas. We have before us a compilation of all the Imperial statutes relating to the protection of intellectual property,* and are struck with the explicit manner in which, on page 133, *nutrients and medicaments are excluded from patent protection and made the common property of the public, save in so far as the alleged invention involves a new and definite process of manufacture.* Thus, sulfonal, for example, enjoys patent protection in Germany, but not in the ironclad, monopolistic and exclusive manner which prevails in our American patent-régime. The German patent covers only the process of producing a therapeutic agent—not the substance itself. Sulfonal is manufactured in Germany by a number of competing factories, each operating under special patent on the process employed. This happy exemption of the substance itself has stimulated investigation, has improved and multiplied the modes of production, and has, moreover, reduced the selling-rate to a mere fraction of the original price.

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* *Die Reichsgesetze zum Schutze des gewerblichen geistigen Eigentums. Mit Einleitung und Erläuterungen von C. Davidsohn,* Oscar Beck, Munich, 1893.

The anomaly of the whole patent business, as we see it in America, becomes almost humorous when we observe further that the German inventor, while content with such protection as the law gives him at home, is yet very careful to take advantage of our absurd legislation, and to patent the *product* itself in America, thus excluding competition and creating a monopoly as stringent as an unwise law can possibly engender. It need not be added that such agents are marketed at excessive rates, and the consumer pays more than handsomely for the foreigner's protection. We Americans are fond of calling ourselves a practical people, and we plume ourselves not a little on our wide-awake shrewdness; but the manner in which we permit foreign chemical manufacturers to exploit us shows plainly that cleverness is not the exclusive property of our legislative Solons.

The whole fabric of patent protection in medicine and pharmacy is one which we have always regarded with unconcealed disfavor: we hold that its tendency is mischevous to science. Yet it is idle to deny the utility—nay, the positive value—of many protected agents, especially among the synthetical remedies. They have indisputably enriched medicine in numerous instances, and physicians will persist in their use—not without warrant. The path of wisdom would accordingly seem to lie, not in the exclusion of new inventions fraught with rich benefit to medicine, but rather in doing away with the custom of patenting the substance itself.

The invention of a process for producing a new remedial agent—a definite chemical compound—with properties superior to those of other known products, is often the fruit of prolonged research by a competent student; reflects high credit on the inventor; and should of right yield him such profit as may accrue from the protection of his process by patent. If such chemical is valuable in the treatment of disease, other investigators will be stimulated to discover new means of effecting the same purpose—the manufacture of the article—by a different process in turn deserving of patent, and so forth. A healthy competition is thus created, which increases the number of methods, and reduces the cost to the consumer.*

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* Let no one, however, fail to note how differently the case stands with the many compounds which represent solely the favorite prescription of some physician, or the mere mixture of familiar drugs. What scientific education or long study is here required? Every tyro in medicine or pharmacy may launch such remedies on the market by the score, and their manufacture certainly merits no protection. It is, indeed, true that the majority of such compounds or mixtures are not patented. In these instances, however, the proprietor can afford to dispense with protection of the formula, since the trade-marked or copyrighted name renders the product virtually the undivided possession of its exploiter.

ENTERTAINMENTS AT THE FORTY-SECOND MEETING.

On Monday evening, September 3d, at 8:30 p. m., a reception was held by the officers of the Association in the spacious ball-room of the Battery Park Hotel, which for the week had been placed at the disposal of the American Pharmaceutical Association by the affable manager, Mr. McKissick. The reception was attended by about 300 ladies and gentlemen, many of whom were present in full evening dress; after the formal introductions were over, some time was spent in pleasant conversation, and then the floor was given up to the younger people for dancing, which was much enjoyed and proved a great success, owing to the excellent arrangements of Messrs. Chears, Rogers and Smith.

On Tuesday evening a crowded audience again assembled in the ball-room to enjoy some vocal and instrumental music, interspersed with character delineations. The artists who had kindly volunteered to assist in the entertainment were Miss Alma Dohme, of Baltimore, who sang some very pretty solos, and whose well-trained voice added much to the enjoyment of the evening, and Mr. Polk Miller, of Richmond, that prince of negro-dialecticians, whose inimitable rendition of negro stories and plantation songs kept the humorous chord vibrating in every breast. Miss Dohme accompanied herself on the piano, and the Asheville orchestra rendered choice selections during the intervals. How thoroughly the audience appreciated the programme was fully attested by the repeated and hearty applause bestowed upon the participants.

One of the most enjoyable events of the week was the grand carriage drive on Wednesday afternoon, which afforded every one an opportunity of seeing Asheville and its surroundings in all their beauty. The long line of carriages, led by the tally-ho coach carrying the leading officers of the Association and their ladies, and marshalled by Messrs. Smith, Rogers and Heinitsh on horseback, left the hotel about 3 o'clock and, slowly wending its way through the principal streets, crossed the Swannanoa river at the ford and then drove to the railway station, whence the whole party were carried by special train to Biltmore, the magnificent estate of Mr. George Vanderbilt, the New York millionaire, at the confluence of the Swannanoa and French Broad rivers, where an hour or two were spent in inspecting the wonderful improvements now in progress there. The imposing structure which Mr. Vanderbilt is building as his future home is without a parallel in this country, and when completed will, in its entirety, probably not be excelled by any palatial residence in the world. The enormous power of wealth for satisfying individual tastes and desires can nowhere be more fully realized than at this spot, where mountains have been made and unmade by the hand of man to feast the human eye, and where proud nature's grandeur has been made so completely subservient to the artist's mind. A description of this wonderful estate is out of the question in this limited space—suffice it to say that whatever art and science can suggest and money can provide, to add to the comfort and enjoyment of the mind and body, will be found here, and the future occupant of these massive halls should be able here to find thorough contentment and happiness, if such are ever to fall to the lot of man. It is to be hoped that when Mr. Vanderbilt removes his residence to this princely castle and its surroundings, he will not be entirely shut out from the world at large, but will keep alive that divine sense of charity toward amelioration of the condition of his fellowmen, without which wealth is a curse and the life of the wealthy an aimless existence. After wandering in groups through the incomplete buildings and adjacent grounds, the visitors, at half past five, again took the train and found the carriages in waiting upon arrival at the station; the return drive was over the well-known Beaucatcher mountain, passing the beautiful Kenilworth Inn on the way and reaching the hotel about half past seven o'clock.

On Thursday evening Major Rhoades, the proprietor of the justly renowned Kenilworth Inn, tendered the members of the Association and their ladies a reception, which was largely attended. This mark of attention by the management of a rival hotel was highly appreciated by every one and called forth many encomiums of praise. Carriages were kept busy for hours between the two hotels, conveying the guests to and fro, free of charge, and the moonlight ride up the mountain was most enjoyable. The superior appointments of the Kenilworth, together with its beautiful sun-parlor and lavishly furnished suites of rooms, were greatly admired by all, and after a sumptuous repast offered by the genial host, every one returned home with the decided conviction that the Kenilworth Inn is preeminently the most desirable place for a pharmacist's sojourn during his summer vacation.

A trip by rail along the banks of the French Broad river for a distance of 36 miles to the Hot Springs closed the series of entertainments on Friday afternoon, and more varied and enjoyable scenery could not well be found than was met within this short stretch. Arriving at the Springs many indulged in a warm bath, while others preferred to loiter in the shade on the lawn. Lunch was served by the proprietor of the Mountain Park Hotel and eagerly taken advantage of by a hungry crowd who had left Asheville without dinner. A pleasant ride of about 1½ hours brought the excursionists back to the Battery Park Hotel in time for a late supper.

Unfortunately the beautiful mountain scenery around Asheville, for the enjoyment of which the location of the Battery Park Hotel offers particular advantages, was hidden from view during the greater part of the time by a hazy atmosphere, and only at intervals were the visitors allowed to feast their eyes on the grand panorama spread before them in the Land of Sky.

At half past two on Saturday afternoon, September 8, the northern and eastern members of the Association started homeward on a special train, and after reaching Salisbury, where supper was served, the party were treated to an unexpected delay of six or eight hours by a wrecked freight train. A part of this time was pleasantly spent in congregating on the railway platform and listening to some choice solos and duets by Geo. J. Seabury and Polk Miller, with frequent chorus accompaniments by the audience. Mr. Miller's negro songs proved particularly attractive to Salisbury's dusky citizens, of whom many collected to hear him sing about "de sweet watermillion smilin' on de vine."

CHAS. CASPARI, JR.
Permanent Secretary.

ANNUAL REPORT

ON THE

PROGRESS OF PHARMACY.

From June 30, 1893, to July 1, 1894.

By Henry Kraemer.

Outside of the changes mentioned in the Preliminary Report of the Reporter to the Association at the Asheville meeting, the Report on the Progress of Pharmacy is practically akin to the Report of last year in material incorporated and arrangement. The following is an index of headings:

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INTRODUCTORY.

Pharmacy for the Pharmacist.—In the highly important communication on the Imperial British Pharmacopœia (Pharm. Jour. Trans., 1894, 661), by Prof. Attfield, a note was struck, the significance of which cannot be overestimated in its bearing upon the progress of pharmacy. For the paper practically embodies an authoritative recognition of the principle that in pharmacy, as elsewhere, the highest development is only attained as specialization of functions reaches its extreme limits. It is not only inevitable that pharmacists must face the realities of their position, but also in every way desirable that this be done sooner rather than later. Nor should there be any doubts or scruples on their part to cut themselves adrift from ancient associations and prejudices, if they can thus more firmly establish themselves as independent practitioners.

The pharmacist should be the only authority in his particular sphere of activity; but in order to attain that position he must also be content to confine himself, in his professional capacity, within that sphere. Though rightly enough and necessarily a man of many parts, he must, as a pharmacist, subordinate all his varied scientific and technical knowledge to the practice and advancement of his art. Pharmacy should not be regarded as a branch of chemistry or botany, nor as the "handmaid" of medicine, but as a distinct branch of medicine, and an art to the proper devevelopment of which the technical application of chemistry and botany is essential. *The pharmacist is not specially a chemist or botanist, any more than he is a mere hanger-on of the medical profession; but he will reap the greatest benefit from his scientific training by applying the results of that training in pharmaceutical practice, rather than by attempting to usurp the functions of professional chemists, botanists, or medical men.*

Nor will his status suffer in any degree by such restriction, for the pharmacist who confines himself to his proper business and conducts it in an efficient manner, stands on an equal footing with any professional man with whom he may come in contact. As a specialist his position will be unapproachable by any one who has not undergone a similar training to himself, and all that is requisite to bring about this much-to-be-desired consummation is that he should first clearly define the mutual relations existing between himself and his art, and between pharmacy and all associated subjects, then strive his utmost to advance and persuade others to advance within the prescribed limits.—Pharm. Jour. Trans., 1894, 671.

A Problem in Pharmacy.—J. U. Lloyd calls attention to the "plant dirt," "matter out of place," in the official and galenical preparations. The official extracts and tinctures of plants may nearly all of them be made as mobile as alcohol and but slightly colored or colorless. The author calls attention to pharmacists to renew the study of plant constituents. The field still belongs to pharmacy. It will not do much longer to break up by heroic chemistry the natural compounds in which active agents exist in the plants; the opposite course has to be taken, and pharmaceutical skill should be applied so as to retain them intact as formulated by nature. Exclude from tinctures and extracts the useless substances, allowing those desirable to remain. If the bulky plant dirt is thrown out of the preparations of official galenical pharmacy, such remedies will replace fluid extracts, and be as active as fluid extracts are now. Their therapeutical constituents will remain intact, associated as nature has combined them, and in the majority of cases, being nearly or quite colorless, they will produce very light colored liquids. Then fluid extracts and tinctures, if the names are retained for the perfected liquids, will not precipitate but will remain permanent, carrying their physiological energies unchanged.

Unless there be a revival (and there seems to be no prospect for such) the practice of plant pharmacy will fall exclusively into the hands of manufacturers, who, working by private methods and with the aid of accomplished pharmacists and chemists, can and will accomplish that which seems to be now generally overlooked, and which lies dormant among the outreaches beyond pharmacy. They will not hesitate to bring the facts before the medical profession, and to thrust the apothecary still further back from his original but more and more deserted domain. Perhaps no more serious problem than this confronts the pharmaceutical profession. If pharmacists are content to remain inactive, they will, so far as galenicals are concerned, further at least in their own practice the extinction of their art. The authority of the Pharmacopœia of the United States, backed by the code of the regular physician, cannot force crudities upon the public if medical outsiders (irregulars) and advanced manufacturers present in contradistinction clean preparations made on scientific principles.—Pharm. Rund., 1893, 291.

PHARMACY.

APPARATUS AND MANIPULATIONS.

Aluminum for Laboratory Uses.—G. Bornemann, (Ber. d. Chem. Ges., 1893, 3637) shows the advantages of aluminum as compared with other metals, especially sheet copper. He points out its resistance to H_2S, hot and moist air, sulphuric and nitric acids and the organic acids, its low specific gravity, its high specific heat and its good conductivity for heat and electricity. He compares an air-bath of aluminum during heating and cooling with a copper air-bath, showing that the former is more easily heated and effects a more uniform internal distribution of heat. The metal remains perfectly bright, and after being used for three months, it shows only a very slight whitish coating. The exfoliation noticed in copper does not occur here. The coating consisted of alumina or basic aluminum sulphate. The metal is scarcely attacked within by the action of boiling water. After use for three weeks a loss of weight could not be recognized. Rings and clamps as supports proved satisfactory. Sand-baths and crucibles of aluminum cannot be recommended, as they are softened at 500°. Chimneys for burners and funnels for hot water were satisfactory.

Improvements in Balances.—A number of papers by A. Stift (Oesterr.-

Ungar. Zeitschr. f. Zuckerindus. und Land., 1891, Hept. 6) and R. Pensky (Zeitschr. f. Instrumentenkunde, xii., 221), which require the accompanying illustrations.—Zeitschr. f. Analyt. Chem., 1893, 576.

New Chemical Balances.—Illustrated article by C. Schierholz.—Chem. Zeit., 1893, 1269.

Metric System in Medicine—Plea for the Introduction of.—J. Mora Moss discusses the advantages as: convenience in reckoning; inter-dependence of the units of weight, capacity and measure; and universal use.—West. Drug., 1894, 211.

Our Metric Standards and Unit.—Wm. Hallock gives a very simple explanation on this subject, and how the meter is the keystone of a whole system. The "meter and kilo of the archives" are our standards, and our more complex units are directly derived therefrom. Only our two intermediate units, the foot and the pound, are in the old system, if indeed such a heterogeneous conglomeration can be dignified with the name of "system." Let us hope that this anomalous condition will soon pass away. The physicist and the chemist already use the metric system exclusively, and we look to the apothecary and the physician to take the next step toward the millennium when our antequated units will be laid away with the antiquated methods of communication and transportation, and when we shall no longer accomplish twentieth-century deeds and measure them in mediæval units.—Alumni Jour., 1894, 63.

The Fundamental Standards—Bulletin No. 26, of the United States Coast and Geodetic Survey, makes formal announcement that hereafter the International Prototype Meter and Kilogram will be regarded by the Office of Weights and Measures as fundamental standards, and that the units hitherto in use, the yard and pound, will be established therefrom, in accordance with the Act of July 28, 1866. The following are the equations established by the Act:

1 yard is equal to $\frac{3600}{3931}$ (or 0.915772) meter.

1 pound avoirdupois is equal to $\frac{1}{2{\cdot}2046}$ (or 0.4536) kilogram.

The standards in the possession of the office were presented to the United States by France, and are made of platinum, alloyed with 10 per cent. of iridium. The French government had copies made of its standard meter and kilogram, and presented them to each of the nations which took part in the international conference on weights and measures which took place in Paris some years ago.

Experiment had established the fact that an alloy of platinum and iridium, consisting of 9 parts of the former and 1 part of the latter, remains constant at all temperatures (or at all temperatures to which they would be likely to be subjected); but at the time, and up to two or three years ago, all the free iridium in the known world would not have sufficed to make more than a fraction of the required copies. The solution of the difficulty thus presented affords a remarkable illustration of how science finds a way to supply any material for which a demand has been created in the arts or industries.—See Iridium.

Practical Use of Metric System.—John E. Goff lays stress upon thinking in this system.—Amer. Drug. and Pharm. Rec., 1894, 311.

Weights and Measures by the Decimal System have received an increased impetus during the past year. On January 1st, the Government of Nicaragua adopted the metric system. A deputation also urged the adoption in England or the appointment of a committee of inquiry into the subject. —Squibb's Ephem., 1894, 1541.

The Metric System.—E. S. Smythe, in Meyer Bros. Drug., 1893, 196.

Table for Converting Metric Weights into Troy Weights.—Pharm. Rund., 1894, 100; Meyer Bros. Drug., 1894, 47.

"Bar," a New Metric Weight.—The German government proposes the introduction of the word "bar" (from the Greek *νὸ βύρος*, signifying the last, heavy, large quantity). It is now under discussion whether the term should be applied to 100 kilogrammes or 1,000.—Amer. Drug. and Pharm. Rec., 1893, 220.

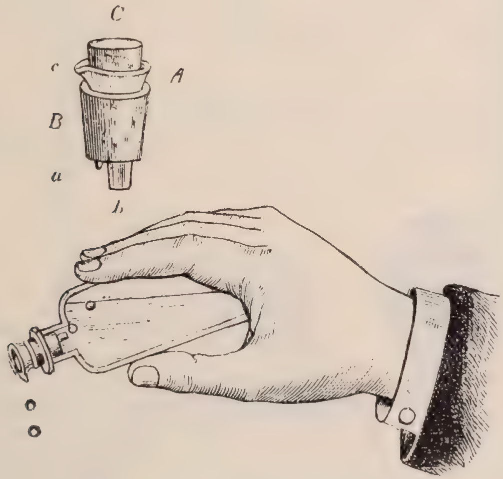
On a New Barometer for the Laboratory.—L. Maquenne.—The object of this instrument is to obviate or to expedite the corrections necessary for other types of barometers. The construction of the apparatus is not shown.—Bull. Soc. Chim. de Paris, xi.–xii., No. 10.

Novel Barometer.—The apparatus consists of a vertical tube twenty millimeters in interior diameter and about one meter in length, the bottom of which is curved in the ordinary manner—the opening at the top, however, being furnished with a steel peg screwed in an iron collar attached to the tube. A long capillary tube one millimeter in diameter, is fixed at right angles on the large tube a little above the curved part, and terminating in an open receptacle. The quantity of mercury is regulated so that the meniscus of mercury presents itself in the middle of the capillary tube. The slightest difference of atmospheric pressure will cause the mercury to rise and act on the capillary column, and a fall of pressure is indicated by the inverse movement of the column. In this way the increase or decrease of the mercury in the large tube is augmented according to the section of the tubes, and in this case, as 400 to 1, so that a variation of $\frac{1}{400}$ of a millimeter can thus be noted. If the variation in pressure become great enough to cause the meniscus to leave the capillary tube, that may be remedied by screwing or unscrewing the upper portion.—Drug. Circ., 1894, 103; from Revista Scientif. Illustriale.

Fletcher's Autometric Stopper.—This stopper, as its name indicates, is a combined bottle-stopper and measuring tube, the latter being graduated either in minims or cubic centimeters. By loosening the stopper, which is made of india rubber, and slightly compressing the air chamber attached, any required volume of liquid can be instantly withdrawn from the bottle, and by pressing an ingenious valve on the top very minute quantities of the liquid can be expelled for making accurate measurements. These stoppers and bottles are at present in four sizes, to measure 30, 60, and 120 minims, and 5 C.c.—Chem. News, 1894, 109.

Dropping Stopper for Medicine Bottles.—The contrivance consists of a cork (*B*) bored to admit a piece of glass (*A*) which ends below (*a*) in a tube for preventing excess of liquid to flow back, and a tube for admitting air (*b*). The tube (*A*) is stoppered with a cork (*C*) and handled as shown in Fig. 1.—Pharm. Post, 1893, 605.

FIG. 1.



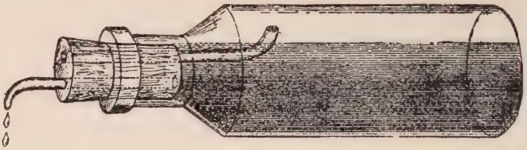
Dropping Stopper for Medicine Bottles.

To Make a Convenient and Exact Drop Bottle.—Insert through the cork two bits of glass tubing, each bent at right angles from each other, and so placed that when finished the cork and the bent ends form a T. The lower end of each tube should pierce well through the cork, but need not go any distance into the neck of the flask. In using such a bottle the only care necessary is to hold the bottle in such a manner that no portion of the liquid in it is higher than the orifice of the bent end, which is a very simple matter. By drawing out the delivery tube it may be so arranged that any degree of exactness in the size of the drop may be obtained.—Nat. Drug., 1894, 53.

Chloroform Bottle.—F. Overholt uses two tubes, one flow and one vent, and packs the conical point of the flow tube with cotton to regulate flow. By this means the chloroform can be made to flow to suit any purpose. When packed so that the chloroform is just on a level with the flow, it will drop very slowly, say once every six to ten seconds; then, by tipping the bottle up, it will drop from sixty to one hundred and twenty a minute.

The advantages are: 1, Any one who can draw and bend glass-tubing can make one in fifteen minutes; 2, it saves chloroform; and 3, it makes possible the giving of chloroform a drop at a time, the merits of which are not under discussion.—F. Overholt in Med. Rec., Amer. Drug., and Pharm. Record, 1894, 147.

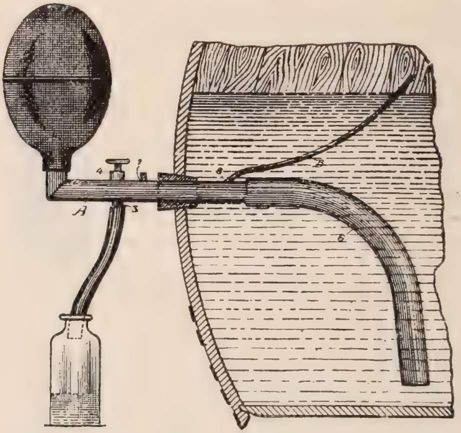
FIG. 2.



Chloroform Bottle.

Bottle-Filling Device.—J. H. Stallings has patented the bottle-filling device shown herewith, the abstract of specifications reading as follows:

FIG. 3.



Bottle-Filling Device.

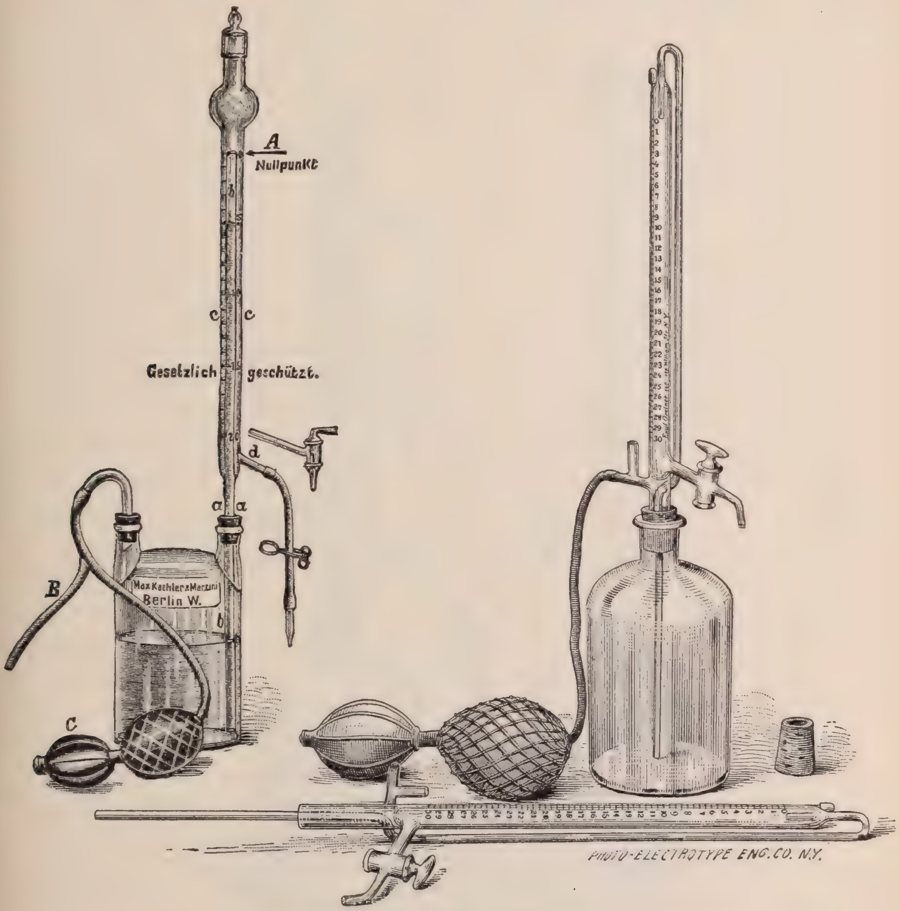
Claim.—1. A filling-device comprising a main tube formed with an outlet pipe, a collapsible bulb on the outer end of the main tube, a valve to close the outlet pipe, a flexible tube on the inner end of the main tube, an air-pipe in the main tube and extending upward at the inner portion thereof, and a packing around the main tube behind the outer open end of the air-pipe, all combined and arranged as set forth.

2. A filling device comprising a main tube formed with an outlet pipe, a valve to close the outlet pipe, a flexible tube on the end of the outlet pipe, an air bulb on the outer end of the main tube, a flexible tube on the inner end of the main tube, an air-pipe opening through the main tube and ex-

tending upward and rearward, and a packing around the main tube behind the outer open end of the air-pipe, all as set forth.—Ibid., 60.

Automatic Zero Burette.—S. Krawezynski, Ber. d. Chem. Ges., 1892, 3010. Into one neck of a two-necked Woulff's bottle of suitable capacity is fixed by means of a cork a burette consisting of an inner and an outer tube, and to the other neck of the bottle is fastened a small two-bladder hand bellows and a side tube for releasing the air pressure after the burette is filled. The inner tube of the burette is open at both ends, reaches nearly to the bottom of the Woulff's bottle, and ends about 5 Cm. below the top of the outer tube, fused on the inner tube, just above the cork, is graduated, and has an ordinary burette tap fused into the side near the bottom. (See illustration, Fig. 4.)

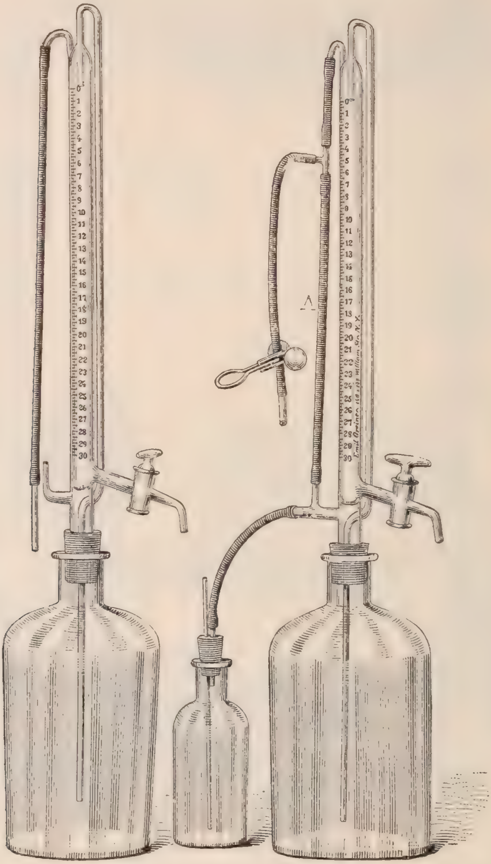
FIG. 4.



Automatic Zero Burettes.

——— E. R. Squibb, to overcome some disadvantages, puts the filling tube from the bottle on the inside of the burette, so that the excess of liquid blown over by the rubber fissure bulbs is syphoned off to the zero point with a fair degree of accuracy and uniformity after the finger is removed from the open end of the T tube on the left. The rubber pressure bulbs in Krawezynski's apparatus are dispensed with, and the burette is filled by mouth suction. In Fig. 5 the apparatus is shown in its simplest form. Here the suction is applied at the top of the burette, the filling liquid rising from the bottle through the outside tube until the zero mark is passed. Then on stopping the suction, the excess of solution is syphoned off to the zero mark and flows back into the bottle. If the apparatus is to be set aside for any considerable length of time, it may be closed against the external air by removing the glass mouth-piece from the suction tube, and slipping the end of the rubber tubing over the turned-up end of the

FIG. 5. FIG. 6.



Automatic Zero Burettes.

glass tube, by which the air is admitted to the bottle to replace the solution drawn up the filling tube.

In many cases, however, it is necessary to exclude the carbon dioxide and other impurities of the laboratory air from volumetric solutions, and to prevent concentration of the solutions by evaporation of their water. These conditions are met in the modifications shown in Fig. 6. Here a small wash-bottle is added, through which all the air admitted to the apparatus, either above or below, must pass, and be washed in passing. This bottle may be supplied with baryta water or lime water, when it will serve to saturate the air through it with moisture, and free it from ordinary gases and vapors. In using this apparatus, a pinchcock is necessary on the rubber suction tube near the mouthpiece, by which the mouthpiece is conveniently handled, and, during the suction, this pinchcock is opened, and the rubber tube below is pinched at *A* by the thumb and finger of the left hand. This apparatus is constantly sealed from the external air, and is safe and accurate for any length of time, and is always in readiness for use, care being taken to well wash the end of the stopcock, and to waste the solution that is outside of the cock, whenever the apparatus has stood unused for even a few hours.—Squibb's Ephem., 1894, 1542.

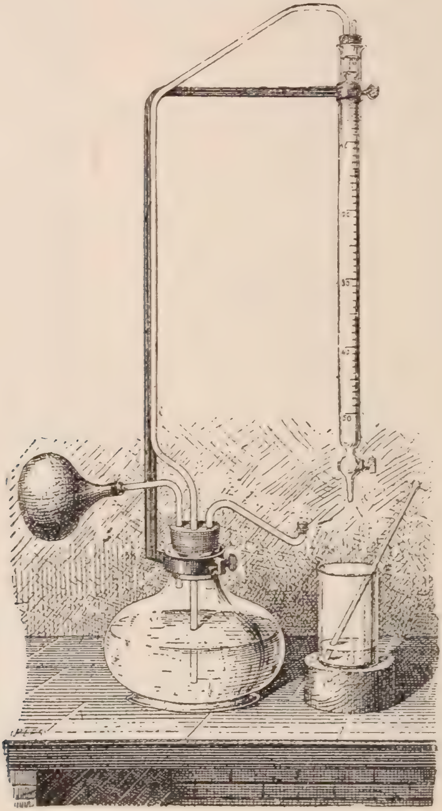
Weight Burette.—The liquid consumed is determined not by volume but by weight. This principle is recommended for rather concentrated solutions. The equivalent is contained not in one litre but in one kilo. Ripper's apparatus is a shortened and proportionately expanded glass cock burette, which can be suspended to the balance by means of a wire or clamped by its neck and its lower end to a stand. It possesses the following advantages: independent of temperature of standard solutions, and of correct graduations, etc.—Zeitschr. f. Analyt. Chem., 1893, Part 4.

Annular Veriner Burette.—C. Meinecke employs a burette which permits of very accurate readings by means of a very fine auxiliary burette. The graduation is carried round the entire circuit of the burettes. The experimentalist titrates as usual, and if the liquid does not exactly stand at a degree, it is allowed to flow lnto the veriner burette as far as the next degree, by which means it is possible to read hundredths of a C.c.—Ibid.

Automatic Zero Adjustment Burette.—L. Kentmann uses a 3-necked Woulf's bottle, the necks of which are closed with stoppers simply perforated. Through one neck is introduced a gas-delivery pipe, by means of which, after pouring one of the liquids into the bottle, any desired gas can be introduced and the air expelled. The second neck is fitted with a Bunsen caoutchouc valve, opening outwards, and therefore permitting the exit of air, but not its entrance. To the third neck is fixed a burette with a glass cock filled with the second liquid. To protect this from the action of air, and to hinder the entrance of air into the mixing bottle, liquid paraffin is poured upon the liquid so as to fill the burette entirely. In order to allow the entrance of the second liquid the upper end of the burette is connected with a gas-generating apparatus.—Pharm. Centralhalle, 1893, 218.

Automatic Burette.—Guichard (Rép. de Pharm., 1894, 204; Jour. Pharm. Chim., 1894, 156) describes the following: The flask containing the titrating liquid is closed by a rubber stopper through which pass three glass tubes. One of these tubes opens into a rubber bulb which, when compressed, forces the liquid over into the graduated burette, filling it up to the zero mark, the excess of liquid returning to the flask when the pressure on the bulb is relaxed. The burette is then ready for the operation.

FIG. 7.



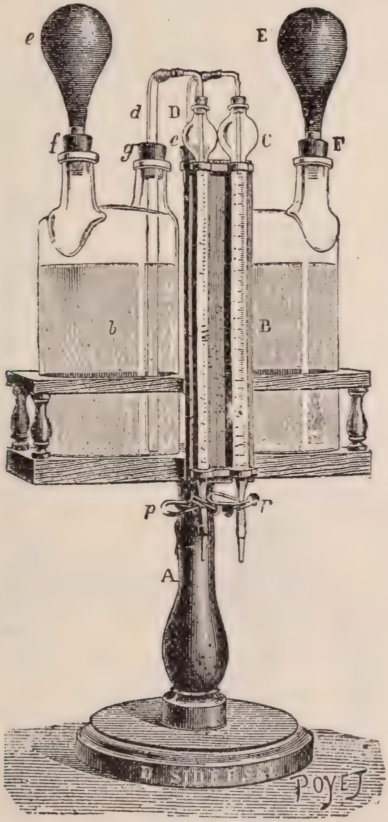
Automatic Burette.

When the titration is completed the third tube is brought under the burette and connected with it, the stopcock is opened and the liquid flows back into the flask for future use.

The burette is provided with graduations in C.c., and also in the hydrometric scale.

A Double Burette.—D. Sidersky, in Rép. de Pharm., 1894, 203, describes an apparatus to facilitate use where two liquids are used in volumetric analysis. The construction of the apparatus is shown so plainly in the illustration as to require no further explanation.

FIG. 8.

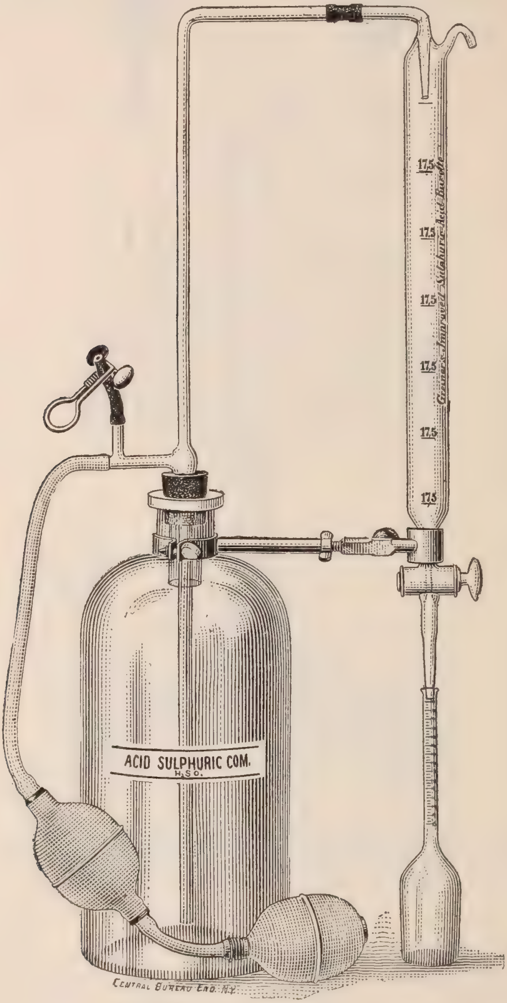


A Double Burette.

On compressing the bulbs *Ee* the liquid rises through *Dd* into *Cc* until the burettes are filled, after which any surplus is drawn back by the syphon formed of *Dd* until the zero point is reached in the burette.

Sulphuric Acid Burette.—This is especially adapted to measure quickly and accurately the sulphuric acid for the Babcock milk test. In using this burette it is simply necessary to take out the glass stopper of the acid bottle and insert the rubber stopper through which the syphon tube is put, then attach the clamp to the neck of the bottle and fasten the burette into the same. Connect the burette to the syphon tube by a small piece of pure gum tubing, attach the rubber bulb and pinchcock as shown in cut, and the apparatus is ready for work. By compressing the end rubber bulb several times the acid is forced into the burette, and pumping is carefully continued until the acid has just reached the top mark on the burette, when the pinchcock on the side of the syphon tube is opened by pressing, and the excess of acid will flow back into its bottle and the acid in the burette will remain exactly at the top mark and measuring can begin at once.

FIG. 9.



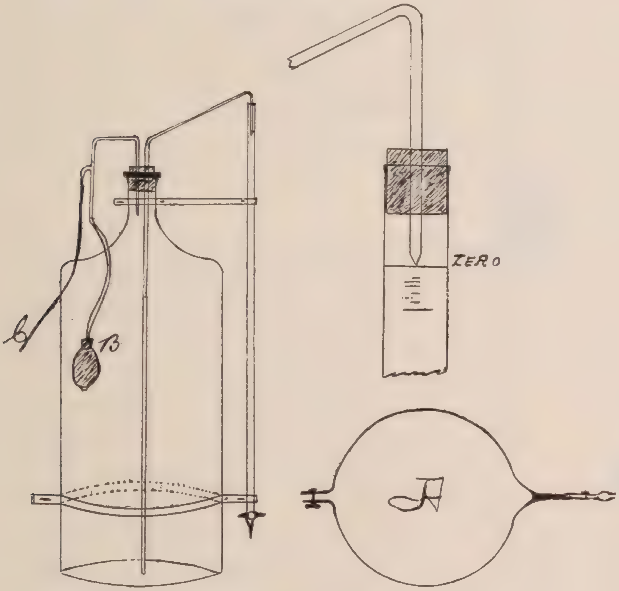
Sulphuric Acid Burette.

Care should be taken not to pump too forcibly, but just enough to make the acid flow into the burette to the top mark, and the moment the acid should pass this mark to open the pinchcock at once. When one acid bottle is emptied this apparatus can be attached to the next bottle, and so on.—Amer. Drug. and Pharm. Rec., 1894.

Stationary Burettes.—J. M. Francis.—Bull Pharm., 1894, 106.

The apparatus illustrated is not original with the writer; in fact, its greatest recommendation lies in the fact that it has been thoroughly tested. The burette is held immovable in front of the container by means of two clamps *A*, made of brass strips $\frac{1}{20}$ inch thick and one inch wide; these clamps are adjusted by means of thumb-screws.

FIG. 10.



Stationary Burette.

The acid or alkali is forced over into the burette by compressing the rubber bulb *B*, the rubber tube *C* being closed between the fingers; when the liquid rises above the zero point, the tube *C* is released and the excess of liquid in the burette siphons back into the container. Acids and alkalies, even when very dilute, may be preserved for months by simply pouring on top of them a $\frac{1}{4}$-inch layer of neutral coal oil or benzine.

Burette Float.—R. Benedikt (Chem. Zeit., 1893). The mark is inside, so that it cannot be obliterated by use.

Centrifugal Machine for Analytical Purposes—Various Applicability of the.—Various machines have been described by W. Thörne (Chem. Zeit.), C. G. Hanbold, F. Heynemann and F. Hugershof (trade circulars).—Zeitschr. f. Anal Chem., 1893, Part 2, 205.

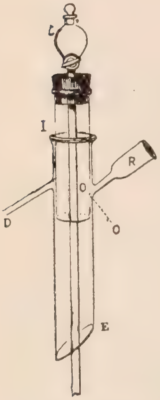
Centrifugal Separators.—The centrifugal consists of a so-called "running drum" which is surrounded by an immovable cover, the collecting drum. The power for the pharmaceutical centrifugal is applied from below, in order that the contents of the machine may not be contaminated by any drip of oil from the driving gear.

The running drum is perforated like a sieve and is used either as it stands or with a piece of more or less fine sieve cloth laid inside of it, according to the character of the substance on which it is to be used. The collecting (exterior) drum is connected with an outlet tube through which the separated liquid is led away.

In using the centrifugal sudden or backward movements are to be avoided, as these are injurious to the machine and also retard the work. The machine is set in motion slowly and steadily, the speed being gradually raised and the movement being allowed to die out of itself after the process is completed. The contents should also be put in carefully and as evenly distributed as possible, as otherwise the strain will be uneven, to the detriment of the machine and of the work.—Dieterich's Pharm. Manual, 1893, 6th Ed.

Condenser with Internal Circulation.—A wide tube, closed at one end, is fused into the lower end of a wide condenser tube, so that a narrow, annular space is left between them. The inner tube is fitted with a cork carrying two tubes, one for the entrance, the other for the exit of cold water. One end of the outer tube is connected with the distilling flask, and the lower end with the receiver. If necessary, a third tube may be added, giving an outer circulation of water as well.

FIG. 11.



Condenser.

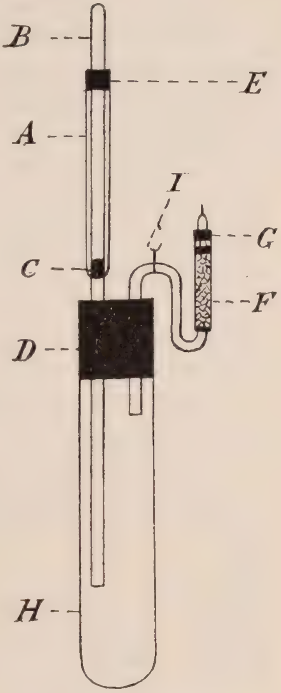
Commutation for Condensers.—This consists of an external tube, *E*, carrying two tubulures, one of which, *R*, communicates with the reflux condenser, whilst the other, *D*, can be attached to a descending condenser. The internal tube, *I*, turns in such a manner that the aperture, *O*, can be brought opposite either *R* or *D*. The apparatus is attached by means of a cork to the vessel containing the liquid, and the vapor can be sent into either condenser by altering the position of the aperture *O*. A funnel, thermometer, etc., can be passed through the inner tube, as shown in the figure. —A. Bidet, Compt. rend., 1893, 478; Jour. Chem. Soc. (Abs.), 1894, 231.

Gravimetric Determination of CO_2*—Apparatus for.*—J. H. Hoseason describes a simple, light and useful apparatus for this purpose as follows:

A is a straight tube enlarged at its upper end. In the upper end of *A* works a glass rod *B*, which is fitted at its bottom end with a piece of india-rubber tube *C*. By pushing *B* gently down, the india-rubber tube closes the orifice of *A* at its contracted portion. A one-hole cork, *E*, is fitted in the top of *A*, through which the rod *B* passes.

F is a tube made somewhat like *A* and then bent into an S shape; the wider portion is fitted with a one-holed cork *G*, which is fitted with a piece of glass tubing drawn out to a point. The wider portion of *F* is packed first with a piece of cotton-wool, then with small pieces of dried calcium chloride, and with some more cotton-wool.

FIG. 12.



Gravimetric Apparatus.

A and *F* are next fitted into the two-holed cork *D*, which may then be fitted into the test-tube *H*.

To work the apparatus: The carbonate is weighed into *H* and a little water added. Then the cork *E* is raised and *B* pressed well down. The acid (H_2SO_4, 1 to 2) is introduced into the upper end of *A*. *E* is then replaced. *C* now forms a perfect stopper, and no acid can get into *H*. The apparatus being now fitted up, the corks are well pushed in, and a piece of twisted brass wire, *I*, is fastened to *F* at its upper bend. The apparatus is then suspended by *I* from the beam of the balance and weighed. *B* is carefully slid up, and the acid flows down the lower end of *A* on to the carbonate in *H*. The CO_2 passes out of the tube *F*, and is dried by the $CaCl_2$. After letting down a little acid, *C* is always pushed tightly in again. After all the carbonate is dissolved, *C* is slid up a little, and *E* is lifted up and air is drawn through by sucking at the tube in *G*. *C* and *E* are replaced and the contents of *H* gently warmed for a few seconds, and air again drawn through. This may be repeated. Loss in weight gives CO_2 evolved.—Pharm. Jour. Trans., 1893, 216.

A New Colorimeter.—Gallenkamp's Colorimeter consists of two troughs of mirror-glass placed side by side. One of the troughs has the form of a parallelopipedon, and contains the liquid in question. The other, which is wedge-shaped downward, contains the normal solution.—Chem. Zeit., 1893, 1452.

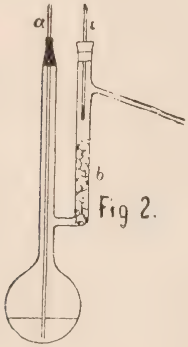
Apparatus Employed in Chemical Operations.—As desiccators, extraction apparatus, etc., reference must be made to Ber. d. Chem. Ges., Russ. Phys. Chem. Ges., Chem. Zeit. (Rep.), Jour. Chem. Soc., Chem. News, Compt. rend., Bull. Soc. Chim., Zeitschr. f. Anal. Chem., Zeitschr. f. angew. Chem., Ann. Chim. Phys., Chem. Centralbl., etc.

Distillation Apparatus for Analysis.—Application in estimating nitrogen by the Kjeldahl process. M. Müller connects the distilling flask, which is fitted with a doubly-perforated india-rubber cork, with a pipette-like apparatus, one end of which is suitably bent and connected with the condenser. The lower end is bent twice at right angles and connected by means of an india-rubber joint with a narrow tube which reaches nearly to the bottom of the distilling flask. At a short distance from the bottom of the 70 C.c. pipette is fixed a rectangular wide tube which just reaches down to the top of the distilling flask and admits the ammoniacal steam. A portion of the steam keeps on condensing in the pipette, and runs back into the distilling flask, carrying with it any trace of fixed alkali which has spirted over.—Zeitschr. f. angew. Chem., 1893, 229.

Distillation in a Vacuum.—A. Angeli. In the distillation of small quantities of liquid under diminished pressure, very good results are obtained by almost filling the distillation flask with glass wool.—Gazzetta., 1893, 104, Jour. Chem. Soc. (Abs.), 1894, 39.

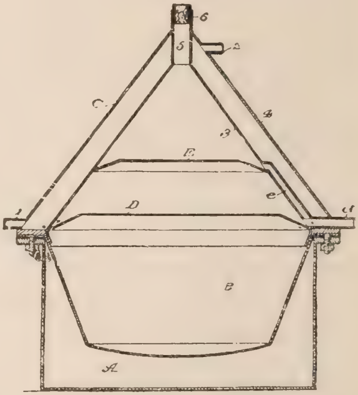
Fractional Distillation.—L. Claisen describes an apparatus for fractional distillation as follows (Liebig's Annalen, 277, 177–178; Pharm. Centralh., 1894, p. 124): A dual distillation apparatus (Fig. 13) is provided on one side with a capillary tube *a* which reaches to the bottom and on the other with a thermometer *c*. It is advantageous to put some pieces of glass in the neck on the side *b*, to prevent the slopping over of the liquid. In using the apparatus with liquids whose boiling points are not too high, the space above the pieces of glass may be wholly or partially filled with glass, thus combining the advantages of the Hempel column with those of the vacuum apparatus.

FIG. 13.



Fractional Distillation.

FIG. 14.



New Druggist's Still.

New Druggist's Still.—C. R. R. Beck. Described in patent abstract as follows:

Claim.—1. In a still substantially as described, the improved condensing hood made conical provided at its apex with a filling opening, and having from base to top a surrounding water jacket provided near its top and bottom with inlet and outlet openings whereby to permit circulation of water through said jacket, a base trough arranged within the hood, and a supplemental trough in said hood above the base trough and provided with an outlet or discharge pipe substantially as set forth.

2. An improved still consisting of the tank, the vessel fitted therein, said parts having projecting lapping flanges at their upper ends, the hood having its lower end rested upon and clamped to said flanges, provided at its apex with a filling opening and having the water jacket inclosing it, and provided with a water inlet and exit whereby water may be circulated through the jacket, a base collecting trough arranged in said hood and a supplemental trough arranged in the hood above the base trough and having an outlet pipe, all substantially as and for the purposes set forth.—Amer. Drug. and Pharm. Rec., 1893, 357.

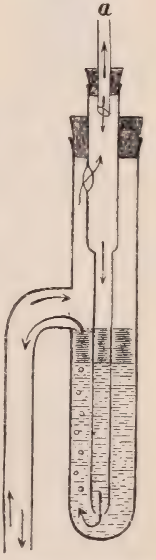
Drying Ovens.—Several drying closets built upon the principle of the circulation of air have been prepared by M. Kähler.—Illustrated article in Ber. d. Chem. Ges., 1893, 3612; Chem. Zeit., 1893, 96 and 611.

Extraction Apparatus.—J. Tcherniac.—A defence of the author's apparatus for extraction with hot ether against the objections urged by Hagemann.—Ber. d. Chem. Ges., 1893, 2357.

Hulsebosch's Extraction Apparatus—Improvement in.—Bass, in Pharm. Zeit., 1893, 426.—The construction of the improved apparatus is shown in the accompanying illustration. The arrows pointing upward show the direction taken by the vapors of the solvent up to the tube *a*, where, being condensed, it falls downward, pursuing the course indicated by the downward pointed arrows, and passes down through the tube *b* into the flask, where the solvent is heated.

To operate the apparatus with a heavy solvent, as chloroform, a tube is used of a slightly smaller diameter than the main vessel, with top and bottom open, the bottom opening being slightly contracted. This tube should be long enough to reach about one to two cubic centimeters above the opening of the overflow tube. Sufficient chloroform is then put into the vessel to fill the inner tube for at least a few centimeters. The liquid to be treated is then poured into the inner tube on top of the chloroform, the tube so connected with the condenser that condensed chloroform will drip into it and thus pass downward through the liquid to be treated, through the lower open end of the tube and up around the exterior of the tube to the overflow.

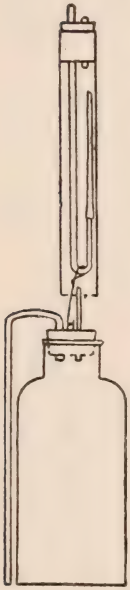
FIG. 15.



Hulsebosch's Extraction Apparatus.

Automatic Extractor.—W. D. Home (Jour. Amer. Chem. Soc., 1893, 270). Under this name the author describes a simple and ingenious apparatus which mechanically delivers a gentle stream of water upon precipitated matter on a filter, and so ensures thorough washing without special attention. The washing is done regularly too, and there is no loss of time. The water supply is contained in a wide-mouthed bottle of 250 C.c. capacity, closed by a cork through which pass two glass tubes, extending just within the bottle. One tube tapers to a moderately fine point, projecting about 3 or 4 Cm. outwardly, whilst the other is twice bent at right angles, and is sufficiently long to reach to the bottom of the bottle outside. When the bottle is inverted air enters by the long tube, and bubbles up through the water, which then flows or drops from the shorter tube. The flow is best controlled by regulating the supply of air through the long tube. To convert the stream of water into an intermittent one, suspended below the bottle is a tube somewhat like an Adams' fat extractor, containing a capillary syphon tube, the longer limb of which passes through a stopper at the bottom. It may readily be made by cutting the bottom off a test-tube (15 Mm. in diameter and 15 Cm. long) and closing one end with a rubber stopper. The syphon tube should be made of glass tubing 3 Mm. in diameter, and have its limbs 15 Cm. and 3 Cm. long respectively. From the short limb hang a piece of rubber tubing, pass the longer one through a hole in the rubber stopper, so that the syphon is quite inside the test-tube, then suspend the whole arrangement beneath the exit tube of the water bottle by means of a short piece of wire attached to the bend of the syphon tube. When the apparatus is in use, water will drop into the suspended tube until its surface rises above the bend of the syphon, and the liquid will then be discharged into the filter placed beneath. The lower end of the rubber tube should be cut diagonally to ensure complete emptying of the syphon at each delivery; and by also varying the length of this tube and regulating the dropping of water from the reservoir, it is easy to so arrange that the right quantity is delivered into the filter each time, and that this shall pass completely through the filter before a further supply is delivered. Though a few supplementary washings by hand may be advisable, to get all the precipitate into the point of the filter, the mechanical washing is said to give results identical with the more tedious method.

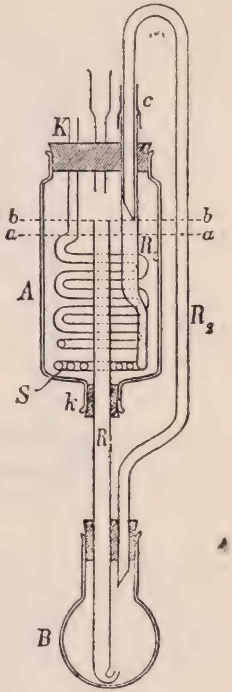
FIG. 16.



Automatic Extractor.

New Extraction Apparatus.—C. T. L. Hagemann. The apparatus figured below has been devised by the author for extracting liquids (aqueous solutions) with solvents. The vessel *A* is charged as far as the dotted lines *aa* with the solution to be extracted. The extracting agent (usually ether) is placed in the flask *B*, which is heated on a water bath : its vapor passes upwards through the tube R_2 into a glass spiral *S*, which is pierced above and sideways with small holes by which the vapor escapes and passes through the solution to be extracted. It condenses and forms a layer on the upper surface of the solution ; when the layer is above *b*, it flows back into the flask *B* through the tube R_1. In order that the solution in *A* may not become heated to the boiling point of the ether, which causes violent bubbling of the entire liquid, so that a portion of the aqueous solution is sometimes carried over into the flask *B*, it is necessary to employ a cooling worm, *K;* a reflux for the ether is, however, unnecessary. The ether should be kept in gentle ebullition, and to insure this, pieces of unglazed porcelain are introduced into the flask *B*.

FIG. 17.

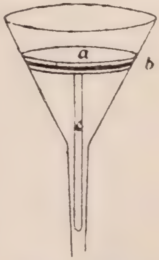


New Extraction Apparatus.

When using the apparatus with extracting agents heavier than water (chloroform, for example), the spiral *S* is placed in the upper portion of the solution, and above the latter is arranged a condenser. A wider tube, open at both ends, is then placed over the tube R_1, and before commencing the experiment a small quantity of the extracting agent is poured on to the bottom of the vessel *A*. The vapor of the extracting agent condenses in drops which fall through the solution and collect at the bottom of *A*. The extracting agent rises in the space between the two tubes just described, until it overflows through R_1 into the flask *B*.—Ber. d. Chem. Ges., 1893, 1975.

Filter Plate—Improved Porcelain.—This plate lessens the probability of breaking the funnel, and it is always in the correct position. The edge of the plate is fitted with a rubber ring, while through its center a glass tube passes down into the neck of the funnel.—M. Kähler. Zeitschr. f. Anal. Chem., 1894, 64 ; Pharm. Centralh., 1894, 124.

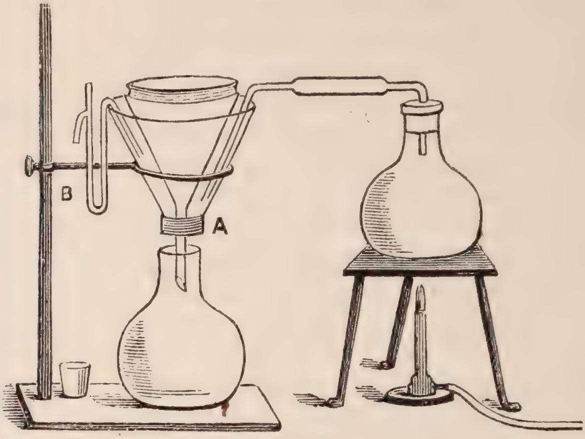
FIG. 18.



Filter Plate.

Hot-Water Funnel.—C. E. Beck describes a hot-water funnel as follows : Two glass funnels fitted one inside the other by an india-rubber plug, *A*, on the neck of the inner funnel, around which the outer funnel fits as a collar. The top of the inner funnel projects somewhat in order that the filtering liquid may be conveniently covered. The interspace contains water, which is kept hot by blowing steam into it, and the excess of water thus formed is carried away by a constant level syphon, *B*; a strip of wet tape hanging over the edge of the outer funnel answers the same purpose. The chief virtue of this kind of hot-water funnel lies in the fact that it can be constructed in a few minutes out of ordinary laboratory apparatus at a very small cost; but it has a second advantage, for by employing steam to maintain the temperature, instead of the naked flame generally used with the copper jacketed funnels, all risks of inflammable vapors from spirituous and other liquids becoming ignited is avoided.—Chem. News., 1894, 61.

FIG. 19.



Hot-Water Funnel.

Apparatus for Hot Filtration.—T. Paul, in Ber. d. Chem. Ges., 1893, 2208.—An illustrated paper that requires the illustrations.—Abstract in Zeitschr. f. Anal. Chem., 1893, 588.

Filtration with an Inverted Funnel.—A. Unguer.—The mouth of the funnel is turned downward and covered with filter paper, over which is tied a protective tissue. To this end the funnel is tied with a projecting edge.—Zeitschr, f. angew. Chem., 1892, 418.

Filtering and Distilling Cabinet.—W. H. Hostelley describes a cabinet for facilitating the operations of filtering and distilling. The article is profusely illustrated and too explicit to make an abstract.—Drug. Circ., 1893, 267.

Arrangement for Decantation and Filtration.—W. Saulmann (Zeitschr. f. Anal. Chem., 1893, 207). Illustrations accompany this article.

Filtration of Corrosive Liquids.—Boettger recommends the use of pyroxylin as a filtering medium for corrosive liquids, like sulphuric acid, aqua-regia, zinc chloride, concentrated solutions of potassium permanganate, the alkaline lyes, etc., none of which attack the substance.—Nat. Drug., 1893, 139.

Filtration of Liquids.—R. Lezé shows that the phenomena attending the filtration of liquids or their circulation in capillary tubes may be readily studied by application of the centrifugal force. On submitting a porous vessel containing the liquid to be studied to rapid rotation, after placing in it a gauge, it is said to be possible to determine the rate of filtration through the porous wall. Comparative experiments were made with two similar porous vessels, in which distilled water and the liquid to be compared were alternately placed. They were weighed before and after rotation to ascertain the amounts of liquid that had filtered through, and, subsequently, the experiment was repeated, with the liquids in the vessels reversed, so that confirmatory results were thus obtained. The rate at which water passed through the porous medium being taken as unity, the passage of sodium chloride solution (5 per cent.) was indicated by 1.023; potassium chloride, 1.043; sodium nitrate, 1.051; ammonium sulphate, 0.993; alcohol, from 0.59 to 0.67, according to strength; and milk, 0.03. In these experiments a pressure of eight to ten atmospheres was maintained for ten minutes (Comp. rend., cxvi., 1440).

Filtration.—Landis (Jour. Amer. Chem. Soc., xv., 480), notes that by using a *ground glass funnel*, the filter paper may be made to stick so tightly to the glass, that no danger of loss occurs in washing the upper edge of the filter.

Waste in Filtering.—Beadle and Gore have shown that there is an abstraction of salts by colloidal bodies in such a way that these cannot be again entirely recovered by washing. This is particularly noticeable in weak solutions, when the salts are partially decomposed and the percentage strength of the solution much weakened, in some cases by as much as 80 per cent.

The principle is that powdered glass, sand, paper pulp, cotton, etc., when placed in a solution of a salt, exercise a particular attraction for the solids in the solution, and in a very brief time that portion of the liquid which is in the immediate vicinity of the solid is found to be stronger than the remainder of the solution, and the solid is found to have acted as a solvent itself. These conditions vary with the nature and strength of the solution and of the colloidal body, but in very many cases not all of the salt thus absorbed can be recovered by washing with the original solvent.

These facts, so far as they have been demonstrated, have an important bearing upon fiiltration, since the same phenomena must take place through the agency of filtering media. It explains, for instance, why the filtering of lime-water materially weakens it, and probably the same effects may be observed with other solutions. In the case of strong solutions this loss may be disregarded; but in weak solutions the question of filtration may prove to be an important one, and decantation may be more scientific as well as more convenient.—New Eng. Drug., Drug. Bull., 1894, 272.

Filter Paper Freed from Grease.—Schleicher and Schull. This paper is especially prepared for milk analysis according to the Adams' coil process. It is 56 Cm. x 6.5 Cm. and contains only 0.025 per cent. of fatty matter. —Pharm. Centralh., 1893, 221.

Occurrence of Starch in several Filter Papers.—Th. Salzer (Chem. Zeit., xvi., 421.) The papers under certain circumstances give ferrous iodide a deep red color. For the author's explanation of the non-appearance of blue starch iodide, the reader is referred to the original.

Impurities in Filter Paper.—Ad. Andreé, noting that a number of samples of calomel tested by him showed an excess of chloride, took occasion to examine the filter paper used in his examination, and found that it contained both chlorides and starch. The latter would give confusing results in estimating alkaloidal solutions by means of precipitation with iodine solution.—Amer. Drug. and Pharm. Rec., 1894, 45.

Austrian Army Filter.—The filter consists of a container of waterproof cloth, funnel-shaped at the lower end, and with a hole at the bottom. Two wire sieves are superposed within the container—one near the mouth, the other just above the funnel-shaped lower half. Before using the filter, a handful of asbestos is introduced between the two sieves. The filter is suspended over a vessel, and the tainted liquid poured into it. The upper sieve arrests the larger substances which taint the water.—Chem. and Drug., 1893, 472.

Choice of Filter Paper.—Lardier (Rép. de Pharm., 1894), concludes: The essential thing, from a pharmaceutical point of view, is that the filter paper should be well made. Many kinds contain linen, which is dissolved by alkaline liquids. Analysis of numerous samples has proved that filter-paper almost always contains iron, lead, lime, and sometimes copper. It is a matter of indifference whether white or gray paper be employed, when the liquid to be filtered is cold, but not so when it is more or less warm. Aside from the color imparted by gray paper to preparations which are filtered when hot (citrate of magnesia lemonade for example), the latter also acquires a disagreeable taste, due probably to organic substances contained in the paper and conveyed by filtration. These organic substances are present much more abundantly in gray paper than in white. To show this, let a titrated solution of potassium permanganate be subjected to heat, after adding a given weight of gray filter paper. In two or three minutes before the liquid has even begun to boil, the solution will be discolored. To produce the same effect with white paper, the liquid has to boil five or six minutes. As to this subject, all authorities are agreed. Considering it from a medical standpoint, both for the above-mentioned reasons, and more especially that prescribed medicines may not become actual culture-fluids, gray filter-paper should certainly be banished from the pharmacy, and white exclusively employed.

Chamberland Filter.—Guignolet finds that the filtering bougies used in this filter purify water under a pressure of twenty metres, from all microbes during a period of six days, whilst only a limited number of organisms make their way through within twenty-seven days. The bougies are easily sterilized again in the cold and without taking the filter to pieces, by passing through successively solutions of potassium permanganate (1 in 1000) and sodium bisulphite, which totally destroy any organic matter in the pores of the filtering medium. It is recommended that these filters be cleaned on the surface by daily rubbing; that every week, or oftener, if the water used be very impure, they should be sterilized by permanganate as above; and that three or four times a year the two processes should be combined, the cold rubbing being followed by the application of stronger permanganate solution (5 in 1000) and solution of sodium bisulphite (1 in 20). Under these conditions the filters are said to act well for an indefinite period.—Moniteur de la Pharm., xliv., 1417. See also Jour. Pharm. Chim., 1893, 399 and 484.

——— *The Cleansing of.*—E. Lacour. Jour.Pharm. Chim., 1894, 159.

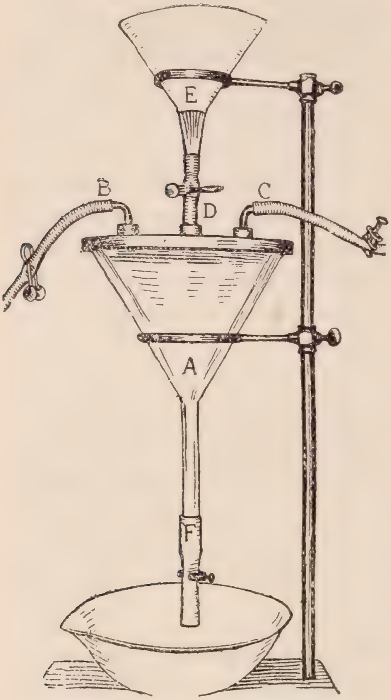
A Self-Regulating Apparatus for Filtration, and Using Hot and Cold Water as Desired.—P. N. Raikow. This requires the accompanying figure.—Chem. Zeit., 1893, 1565.

Filter Presses Employed for Manufacturing Purposes.—Description of presses and filtering medium employed.—K. Göllner. Gyóg. Közl., 1893, 431; Pharm. Post, 1893, 385.

Wash Funnel for Oxidizable Precipitates.—J. A. Forret proposes the following: The funnel *A* is fitted with a perforated metal cone and covered with a circular piece of wood carrying three glass tubes (*B*, *C*, and *D*), to which are attached india-rubber tubes furnished with spring clips. The wooden cover has also a glazed aperture as large as the diameter of the funnel will admit, to enable the operator to see the contents of the funnel. To the stem of *A* is fitted a piece of india-rubber tubing (*F*), into the other end of which a short glass tube is inserted; underneath is placed a beaker or basin of convenient size containing water, under the surface of which the glass tube dips. Into the tube *D*, the stem of a second funnel (*E*) is inserted; both funnels are conveniently supported in the rings of a retort stand.

The apparatus is used in the following manner: a piece of fine calico is placed inside the metal cone, and the wooden top cemented to the funnel *A* by means of almond meal made into a stiff lute with water, to which a little glycerin has been added. The tube *D* is closed, and a current of coal-gas, carbonic anhyride, or other suitable gas is passed through the funnel by the tubes *B* and *C*, to displace atmospheric air. The precipitate to be treated is poured into the funnel *E*, and, by means of the clip at *D*, rapidly transferred to the funnel *A*. When the bulk of the water has passed through the funnel the tube *F* is closed by a clip, and the funnel *A* filled with boiled water through the funnel *E*. After the lapse of a few minutes the water is run off and the operation repeated till the precipitate is practically free from soluble salt. The tube *C* is now closed, and the precipitate allowed to drain.

FIG. 20.



Wash Funnel.

It is desirable to maintain a gentle current of gas while the washing is being carried through, and when the tube *C* is closed the resulting pressure guards against the entrance of atmospheric air through any flaw in the connections.—Pharm. Jour. Trans., 1893, 217.

Formenephone.— An instrument described by E. Hardy for use in the analysis of mixtures of two gases of different densities, by the application of sound vibrations. An experiment with this apparatus occupies but a few minutes. It consists of two organ pipes with bellows attached, one being enclosed in an air-tight covering containing pure air, whilst the other is supplied with the gaseous mixture to be tested. The pipes are of the same dimensions and give the same note when blown under identical conditions, but when the air in one of them is mixed with some foreign gas, that in the other remaining pure, the sound of the former is found to be modified in proportion to the amount of the added gas. Details are given of a number of experiments with mixtures of formene and air, and the instrument is said to be well suited for the determination of fire-damp in mines.—Comp. rend., cxvii., 573.

Laboratory Heating Appliances.—Various spirit lamps are described by Barthel, Muencke and a furnace for organic combustion designed by F. Fuche.—Zeitschr. f. Anal. Chem., 1893, 208.

Universal Economical Gas Burner.—R. Rohrer. A safety burner is prepared by Porges.—Zeitschr. f. Anal. Chem., 1893, 210.

Laboratory Apparatus for Speedily Heating Liquids.—Wiesneg. Zeitschr. f. Anal. Chem., 1893, 210, From the Journal des Usines a Gas.

Combination Laboratory Lamp, Retort and Filter Stand.—A. Liversidge. The stand, as will be seen from the figure, is fitted with :

A brass screw clamp (*a*).

Two or more adjustable brass retort or filter rings, which can be placed on the rod by the lateral slit at (*b*).

An Argand burner (*c*) on its peg (*a*), with regulator and copper chimney or shade; this is perforated so as to allow of its being used as a support for dishes, watch glasses or crucibles. With a glass chimney the Argand can be used for illumination purposes.

A support or peg for the Argand or Bunsen burner when not in use (*d*).

Retort and filter ring rod (*e*); this is attached to the foot (*j*) of the lamp by a bayonet joint not shown in the woodcut.

An ordinary fish-tail jet (*f*), on its peg, for glass bending or illuminaion.

A blow-pipe jet (*g*) on its peg.

A Bunsen burner (*h*), provided with an air regulator at (*i*), and a gallery for the support of the draught shade or chimney (*l*).

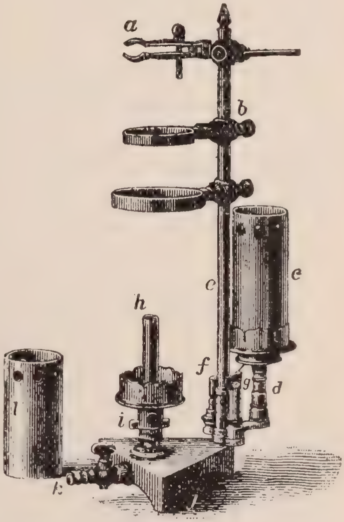
The foot (*j*) is made of lead instead of iron, for the sake of increased stability and to prevent rusting; it also is made to rest on three points, for greater steadiness and to keep it out of liquids which may happen to be spilt on the bench.

A more convenient position for the supply tap (*k*) is at the side at (*j*).

There is also a rose burner, not shown in figure, to drop over the Bunsen burner.

All the parts are interchangeable, and are provided with ground joints, so as to avoid the inconvenience of their becoming fixed, as often happens with screw joints.

FIG. 21.



Combination Laboratory Lamp, Retort and Filter Stand.

When the Argand or other jet is required for use, the Bunsen burner is placed on the peg at the back, from which the former burner or jet has been removed, so that there is no need for any of the parts to get astray when not in use.—Chem. News, 1894, 219.

Indestructible Clay-wick.—"The Amer. Monthly Micros. Jour. brings mention of a lamp-wick made entirely of clay, giving 25 per cent. more light than cotton wick. The clay is made capillary by incorporating with it while in a plastic state filaments of unspun vegetable fiber which are burned out in the process of baking, leaving capillary tubes running longitudinally through the wick, through which the oil from the lamp will be raised to the flame by capillary attraction. Owing to the perfect combustion of the wick the flame is perfectly white in character, devoid of odor, and smokeless. It is found, through a practical test, that the oil is volatilized by the use of this wick and the vapor is consumed, thus giving the above results.

The Lighting Power of Yellow Flame is greater than that of pure white flame ("Industrie Blätter"), as is shown by photometric observation, though when looking directly at the light the white one appears to be the brighter of the two.—Amer. Drug. and Pharm. Rec., 1894, 220.

Sources of Error in Analyses Owing to the Use of Gas.—E. von Meyer (Jour. f. Prakt. Chem.), von Leeuwen (Trav. Chim. des Pays-Bas and Chem. Zeit.), A. Nieben (Akad. de Wissensch. in Wien), Privozink (B. d. Chem. Ges.), U. Collan (Chem. Zeit.).—Zeitschr. f. anal. Chem., 1893, 216.

Temperature and Rotatory Power.—A. Le Bel discusses the variation in rotatory power caused by changes in temperature. He shows that lowering the temperature causes a decrease in the amount of rotation in the case of many substances. Amylic ether free from amylic alcohol gave the following rotations for 20 Cm.:

+ 1°28′ at 65°; + 1°13′ at 15°; + 34′ at —42°.

Methyl lactate similarly indicated for 5 Cm.:

—4°47′ at 100°; —4°2′ at 15°; —2°41′ at —23°.

It is pointed out that that all the bodies actually known with variable rotatory power are simple ethers. Methyl tartrate varies considerably, but when converted into methyl valeryl tartrate the latter compound is almost free from variation (—8°50′ at 16° and 8°0′ at 23°, for 5 Cm.), whilst the tetra-substituted ethers of tartaric acid are practically invariable between 10° and 100°.—Comp. rend., cxviii., 916.

Prevention of Bumping in Boiling Liquids.—G. Craig in Zeitschr. f. Anal. Chem., 1893, 206. Also Pellagio, Winkelhofer and H. Müller in former issues of the Zeit. f. anal. Chem.

Monochromatic Flame.—H. W. Wiley (Jour. Amer. Chem. Soc., 1894, 121), describes an ingenious lamp for producing a constant monochromatic flame such as is now so frequently found of value in optical experiments. It consists essentially of two wheels, driven by clock-work, mounted so that their axles are on the same horizontal line. Their perimeters consist of platinum gauze and the spokes of platinum wire. Beneath each wheel is a porcelain crucible containing sodium chloride or bromide in saturated solution, into which the peripheries dip. The gas burner is fixed between the crucibles, and when, by means of crossed bands, the wheels are made to revolve in opposite directions, they take up a little of the salt solution by the platinum network of their rims, and a minute fresh portion of the salt is thus introduced into the flame every instant. Since the water evaporates from the warm metal before the flame is reached the sputtering caused by a moist salt is avoided, and a perfectly uniform light is obtained, which, it is claimed, can be used for hours without any perceptible variation.

Weight of a Litre of Normal Air and on the Density of Gases.—A. Leduc (Compt. rend., 1893, Dec. 26) proposes to refer the density of gases to nitrogen. The weight of a liter of normal nitrogen at Paris is 1.2570. Its mass at the pressure of one atmosphere, C. G. S., is 1.24006.

Cylinders for Compressed Gases.—Prof. Goodman states that cylinders for holding compressed oxygen should be made of very mild steel, the tensile strength and percentage of carbon of which should not exceed certain limits. Care should also be taken to ensure a sufficient and even thickness of the metal, and the cylinders should be annealed at a cherry-red heat, both when newly made and at intervals while in use. As a further precaution against accident it is recommended that the pressure to which cylinders are subjected in testing their fitness for being charged with compressed oxygen should not be carried so far beyond the actual pressure they will have to bear when in use, as is sometimes done. The consequence of applying very high test pressure is, on the one hand, to encourage the use of steel having high tensile strength with corresponding brittleness, and, on the other, to weaken the cylinders by overstrain.

The conclusion that compressed gas cylinders can be made perfectly safe appears to be very well founded. The equally important question as to how that safety is to be ensured in all cases has not been touched upon by Professor Goodman; but there are now so many applications of compressed gases that a trustworthy guarantee of security from danger is highly desirable, and to that end it would appear satisfactory to have some kind of official inspection and certificate of fitness.—Pharm. Jour. Trans., 1894, 528.

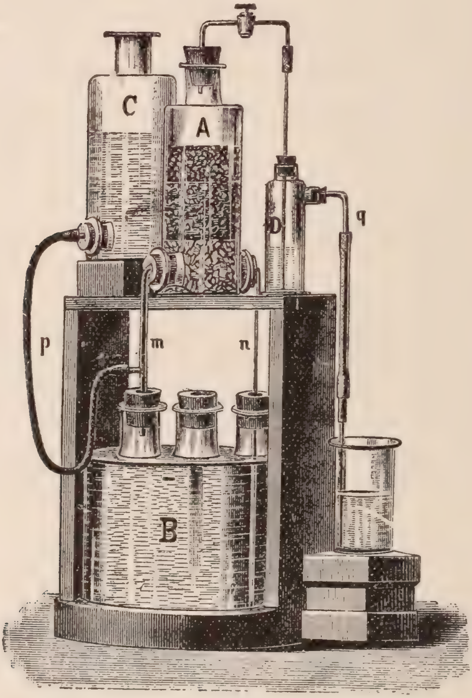
Dissolved Gases in Water.—Prof. Clowes, in Chem. and Drug., 1893, 857. This requires the accompanying illustration.

Pure Carbonic Acid Gas.—A process for making pure carbonic acid gas has been devised by E. Luhmann. It is based upon the property of a cold solution of alkali phosphate to absorb carbon dioxide from gaseous mixtures with the formation of alkali biphosphate and alkali bicarbonate. This solution, on heating, parts with the carbon dioxide, and sodium phosphate is re-formed. For example, a solution containing ten parts of sodium phosphate in 100 parts of water may be used for absorbing carbon dioxide from previously cooled chimney or flue gases; the carbon dioxide is afterward liberated by means of inclosed steam at about 212° F., and the phosphate solution can be used over again. It looks as though it will soon be possible for a manufacturer of aerated waters, working on such a system as this, to use up all his own and his neighbors' smoke, and thus provide a profitable solution of the great smoke problem. —West. Drug., 1894, 98.

An Improvement in Gas Generating Apparatus consists of having the short tube which conducts the gas out of the generating flask closed at the lower end, and with openings on the side. This prevents the accidental stopping up of the outlet tube, which occasionally happens with the other tubes.—Amer. Drug. and Pharm. Rec., 1893, 338.

Sulphuretted Hydrogen Apparatus.—L. L. de Koninck (Chem. Zeit., 1893, 1099). In the flask *A*, provided with two openings near the bottom, a layer of broken glass or porcelain is placed, and on top of this the iron sulphide. The flask *A* being set on a wooden stand, as shown in the illustration, is connected with a three-necked Woulff flask *B* by means of *n*, a tube reaching nearly to the bottom of *B*, and by *m*, a tube opening just below the stopper of *B*. The tube *m* has a branch which is connected by means of the rubber tube *p* to the pressure flask *C*.

FIG. 22.



Sulphuretted Hydrogen Apparatus.

The flask *A*, containing the iron sulphide, is also connected, through a stop-cock, with a wash-bottle *D* having an outlet through the rubber tube *q*—the glass tube at the end of *q* being drawn out to a fine point so that the escaping gas will pass out in small bubbles, thus securing its fullest action. The stop-cock may be attached directly to the bottle *A*.

To operate, place the diluted acid in C and open the stop-cock. The acid will then pass through p and m into A, where, coming into contact with iron sulphide, iron chloride is formed and hydrogen sulphide set free. The solution of iron chloride, on account of high specific gravity, will pass down through n, spreading over the bottom of B, the supply of acid remaining as a supernatant layer. As fast as it is neutralized the acid will pass down into the lower part of B until it is all saturated. The iron chloride solution may then be removed from B by means of a syphon. When not in use the pressure flask C should be placed on the table beside B. The neck of C must be taller than that of B. The pressure is regulated by placing blocks of wood under C.—See also others in Ibid., 1242, 1452.

Coal Gas—Testing Illuminating Value of.—A more definite unit of lighting power, that is used in scientific work, is a surface of just melting or just solidifying platinum of one square centimeter in area. The rule which is the basis of all photometric methods is that the intensity of light varies inversely as the square of the distance. And accordingly the lights to be compared are moved towards and from the point of observation until their visual intensities appear equal. The comparison can be made to the best advantage between the shadows cast by the two lights on an equally bright ground. A chemical method for the valuation of illuminating gas is to determine the extent to which it is soluble in bromine. Nearly all the light-giving constituents of the gas are soluble in that liquid. West. Drug., 1893, 322.

Occlusion of Gases by Metallic Oxides—Richards and Rodgers have found that the oxides of copper, zinc, nickel and magnesium, and perhaps other metals, when prepared by precipitation from the nitrates of these metals, occlude a very notable quantity of nitrogen, and probably other gases. In the case of magnesium it was found that each gram of the oxide occluded over a cubic inch of gas. These facts affect the atomic weights of the metals to an extent that necessitates new determinations thereof, a work that the authors have undertaken.—Nat. Drug., 1894, 116.

Chemical Behavior of Glass.—F. Foerster. In continuation of his previous work on the action of water and of aqueous alkali and salt solutions on glass, the author has now investigated the behavior of acids towards glass. Round flasks of various kinds were employed, the glass, unless otherwise stated, being a calcium-alkali glass, such as is usually applied to chemical purposes. The acid was allowed to act for six hours at 100°. With the same kind of glass the action, which is always less than that of pure water, is independent both of the nature of the acid and also of its concentration between the limits $\frac{n}{1000}$ and $\frac{n}{10}$. With concentrated acids at 160°–190° the nature of the acid is without effect, whilst the amount of change decreases with increasing concentration. The paper concludes with tables showing (1) the composition of the six better kinds of glass employed for chemical purposes; (2) their relative stability towards water, alkalies, and alkaline carbonates. The best glass mentioned has the following composition: $K_2O=6.2$; $Na_2O=6.4$; $CaO=10.0$; $MnO=0.2$; $Al_2O_3+Fe_2O_3=0.4$; $SiO_2=76.8$ per cent.; the ratio $R_2O : RO : SiO_2= 0.95 : 1 : 7.16$; it contains 10.4 mols. of alkali in 100 mols., and is, therefore, almost identical with the glass used by Stas in his atomic weight determinations.—Ber. d. Chem. Ges., 1893, 2915.

Imperfect Glass.—The "Moniteur de la Photo." calls attention to certain invisible defects in glass used for lenses, a subject which has been studied by Dallmeyer. Faulty annealing is one of the most important of these defects. It is caused by too rapid cooling of the crucibles. To put this defect in evidence the glass is examined by means of polarized light, a ray of which is passed through it and examined by means of a Nicol prism. If the glass is imperfect certain curiously-colored figures will be seen, which are sometimes very beautiful, and are, unfortunately, too often witnessed when new batches of optical glasses are thus examined.—Drug. Circ., 1893, 274.

Engraving on Glass by Electricity.—A patent consisting of a brass holder, through which pass two copper wires to a slate-pencil at the end, around which is a platinum wire, so that the current passes through one copper wire, around the platinum wire to the other copper wire, and back to the dynamo. A syphon is introduced through the brass holder, thereby keeping it sufficiently cold to handle. A battery or dynamo may be used to generate the electricity, which must be up to 40 ampères. The current renders the platinum point nearly white with heat, so that it melts the glass under it and cleaves a shaving out of the hardest kind of glass. Some remarkably fine work has been accomplished by means of it, and smoke-quartz, agates, and the like, may also be engraved.—Chem. and Drug., 1893, 310.

Glass nearly Impermeable to Heat.—According to Dingler's Polytechnisches Journal a glass is now manufactured which, while transmitting light perfectly, allows but a small percentage of heat to pass through. The formula is: Sand, 70 parts; kaolin, 25 parts; sodium hydrate, 34 parts. After melting, the mixture is found by analysis to contain SiO_2, 746 parts; Al_2O_3, 84 parts; Fe_2O_3, traces; Na_2O, 154 parts; and CaO, 9 parts in 1,000. A shade 7 Mm. thick almost entirely shuts off the heat from a powerful gas flame.—Drug. Circ., 1893, 154.

Effect of Light on Colored Glass.—Prof. Judd alludes to the changes in color which certain kinds of glass undergo when exposed to light. He said that the green glass panes used in the conservatories at Kew gradually changed through various shades of yellow to a distinct purplish hue under the prolonged action of light. Rubies change their color in a curious way under the action of heat. Bluish rubies turn green, and on cooling regain their original tint. The blue sapphire turns white, and the yellow corundum crystal becomes green.—Amer. Drug. and Pharm. Rec., 1893, 276.

Glass Stoppers.—A new arrangement for keeping the glass stoppers in the bottle. It requires the accompanying illustration.—Zeitsch. Oest. Apoth.-Ver., 1893, 443.

Cutting Glass Tubes, Bottles, etc.—According to Wm. Thomson, this may be accomplished by means of some strips of thick blotting paper from a quarter to half an inch in width, and of different lengths. Two pieces of such paper are wetted and wrapped round the bottle, tube, or other vessel to be cut, once or oftener (once is sufficient). These pieces of paper, cut true, are wrapped round the vessel like two bands. They must not be placed too closely together—say from a quarter to three-eighths of an inch apart for large vessels, and rather less than a quarter of an inch apart for tubes of an inch or so in diameter. When this is arranged, a fine flame about two or three inches long is allowed to play on the glass between the two pieces of wet paper, the vessel being slowly revolved and the point of the flame kept between the two papers. Within a minute usually the vessel separates with a clean cut along the line against which the flame played.—West. Drug.. 1893, 322.

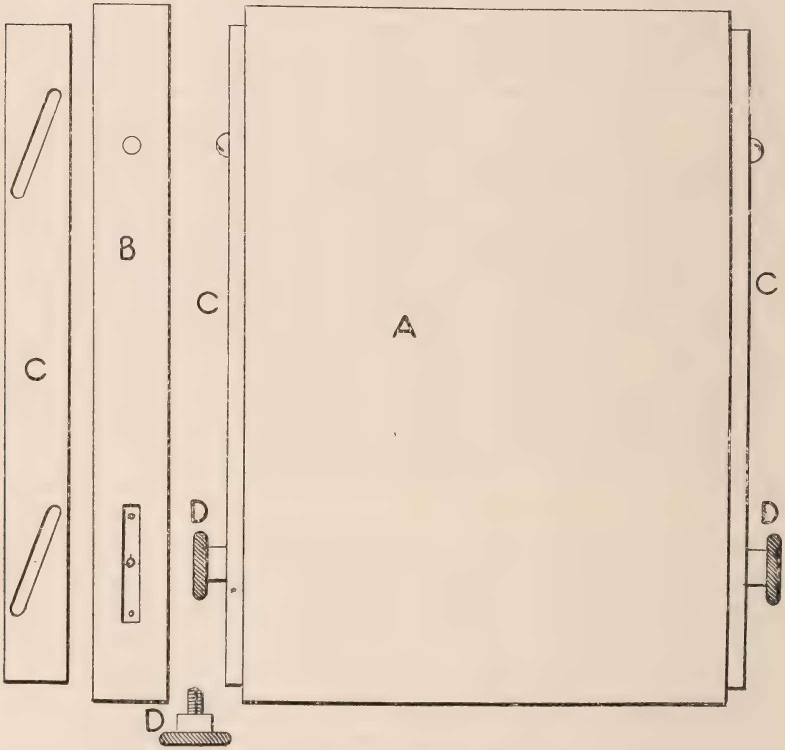
Jena Utensil Glass.—In the "Chemical News" we find that a sample beaker of this glass was submitted to some severe tests: the results showed it to be as good as the makers (Messrs. Baker & Co., Holborn) claim. The beaker was first filled with cold water, and, without drying it on the outside, it was placed over a naked Bunsen flame. When the contents boiled it was quickly emptied and plunged into cold water. Then, wet as it was (but empty), it was again placed over the flame, where it was left till dry (and naturally considerably above 100° C.). It was then plunged into cold water a second time, and it still remained unharmed.—Chem. News, 1894, 181.

Giles' Modified Litre Flask.—The extreme delicacy of most of the reactions used in volumetric analysis by standard solutions renders it of importance to know the exact strength of the solutions employed. To simplify this standardizing, Mr. Giles' modified litre flask, described in a previous issue, has been found of great utility. By its use we have, after the preliminary test, exactly 1 litre of solution to work with, and the calculation of how much water or salt employed has to be added is made very much easier, and in a busy laboratory the saving of time thereby effected is of great importance.—Chem. News, 1894, 128.

Ice—To Make.—H. N. Warren (Chem. News, 1894, 247; Chem. and Drug., 1894, 838). Take a fractional distillation flask, and place it in the desired quantity of water which it is intended to freeze, contained in a suitable receptacle. Through the neck of the flask insert a rubber tube terminating in a glass point, which should all but touch the surface of the liquid contained in the flask, which consists of about 20 C.c. of an equal mixture of ether and carbon disulphide. The further end of the rubber is now connected to a pair of constant bellows, and a brisk current of air continued for about three minutes; almost immediately the thermometer will sink to zero, the vapor of the mixture introduced escaping through the small tubule of the flask, whilst the outside vessel, containing the water, will be found to have become inseparable owing to the thickness of the ice formed. A litre of water can be frozen in half an hour.

Lozenge Apparatus.—W. Proctor, in Amer. Jour. Pharm., 1894, 138. *A* is the board, seen from above. *B* is a side view. *C, C,* slides in place. *C* a slide detached to show the slots; the front one should be ruled to divisions of the 32d of an inch. *D* the set screws, one in place and the other detached.

FIG. 23.



Lozenge Apparatus.

The board is made preferably of a piece of well-seasoned, hard wood, one and a half inches thick, ten inches wide and fourteen long, planed perfectly flat, and both sides and ends made square and true—at each side about three inches from one end a plate is let in flush, and tapped with a screw; on each side a plate of brass one and a half inches wide, fourteen long, and three-sixteenths of an inch thick is fitted; each plate has two slots, crossing the plate diagonally, three-eighths of an inch from each edge; these slots must have exactly the same slope, and through one slot of each plate a square-shouldered screw passes and is screwed in until it presses the plate close to the side of the board, but still permits it to move easily; through the other slot in each plate a set screw passes and enters the screw plate before mentioned; when the plates have been adjusted to a given height, the set screws are turned until they prevent any motion of the plate. After the lozenge mass has been prepared it is weighed, and the weight is then divided by the number of lozenges ordered; the mass is made of the thickness thought to be right by the operator, the cutter applied, and, if the weight agrees with that ascertained by dividing the entire quantity, the work proceeds at once, but if too heavy the guides are lowered, or if too light they are raised until the proper weight is attained.

Monochromatoscope—A New Apparatus.—M. de Thierry. The construction of this apparatus cannot be shown without the two accompanying figures. With it the author is undertaking the interesting study of the latent color of substances, formerly indicated by Govi, and applies it to the optical analysis of metallic and organic powders, as well as to the detection of the falsifications of certain alimentary and pharmaceutical substances. Such bodies as mercuric iodide and vermilion, which by sunlight have colors almost identical, differ absolutely in a given ray, which permits us to see no longer the apparent colors of these substances, but their true colors.—Compt. Rend. cxviii., No. 12.

The Oleorefractometer and its Uses.—Its employment in the French laboratories.—T. Sollmann, in Pharm. Era, 1894, 7.

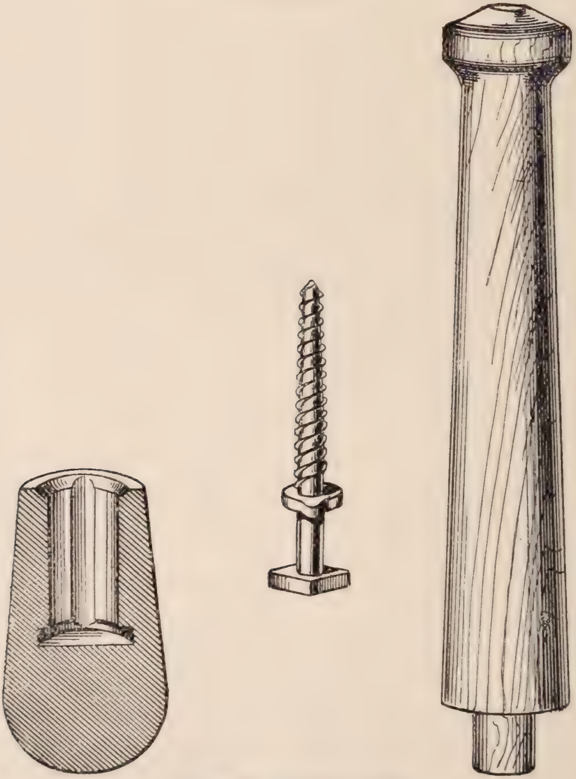
Intermittent Percolation.—In percolating drugs with a strong alcoholic menstruum, there is no trouble in exhausting the drug; but in cases where a weak alcoholic menstruum is used this is not so easily accomplished. In many cases Frank Edel (Market Report) has used what might be called intermittent percolation with good results. It is conducted as follows: The properly moistened drug is packed in a percolator, and the menstruum added as directed in the U. S. P. Then the percolator is closed and the drug allowed to macerate for 24 hours—percolation then being allowed to proceed until 4½ parts of the reserve of 9 parts are obtained. The percolator is then closed again and maceration allowed to continue for 24 hours. Percolation is then allowed to proceed to 4½ parts more, which should be reserved, and the process completed as directed in the U. S. P. It is the belief of the author that in many drugs this process is superior to that directed in the U. S. P., and that by its use a larger percentage of extractive matter will be found in the reserve than by 48 hours' maceration to exhaustion, reserving the first 9 parts; and this, in the opinion of the author, is a result much to be desired. It is an established fact that heat does, to say the least, no good; in many cases it does serious harm. It naturally follows that the more nearly the reserve contains the extractive matter and strength of the drug, the less harm the heat necessary in evaporation can do.—West. Drug., 1893, 218.

Principles of Pharmacy.—Illustrated articles with descriptions of the various operations in pharmacy.—A. E. Hiss, in Registered Pharm., 1893, 1894.

Concentrated Preparations of the U. S. P. for Subsequent Dilution—The Economy and Convenience of Preparing.—F. J. Wulling finds that the following preparations may be made of double, triple or quadruple strength and when used diluted to proper strength: Tr. arnicæ flor.; tr. card. co.; tr. cinchon. co.; tr. gent. co.; tr. rhei; tr. zingiber.; lin. camph.; spts. menth. pip.; spts. limon.; syr. pruni virg.—Pharm. Era., 1894, 155.

Improved Pestle.—I. J. White, in Amer. Jour. Pharm., 1894, 25. The annoyance and inconvenience druggists have had for many years in the use of the old style wax-jointed pestle has been overcome by the use of a

FIG. 24.



PATENT APPLIED FOR.

Improved Pestle.

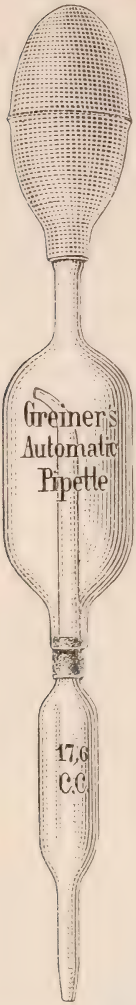
pestle made as below described. In this the wedgewood head has two vertical grooves, of which the cut shows one, running down on opposite sides to a countersunk groove at right angles to the other two. This groove runs around on the inside at about half the height of the head, and is just large enough to permit of the complete turning of the head of the screw. The shank is oval, and has a sliding nut, which falls into the grooves in the pestle head when the screw has been turned sufficiently. The nut when in place prevents the turning of the screw. The oak handle is tapped out to receive the screw, and has a projection which fits into a circular opening in the pestle head, thereby making the joint more stable. In joining the head and the handle the sliding nut must be lifted up and placed at right angles to the screw head. The screw is then placed over the wedgewood head, so that the angles on the head of the screw come in line with the grooves in the pestle head; it is then pushed down to the bottom, given half a turn, when the sliding nut falls into the grooves. The head pulling on the horizontal groove prevents the falling out of the screw. The handle is then screwed on, which thus completes the pestle. A patent has been applied for on this contrivance. The pestle will be placed on the market at or very near the cost of the old style pestle.

Laboratory Press.—O. N. Witt. It differs from those in ordinary use in the fact that the substance to be pressed is placed between two blocks of glazed porcelain, the faces of which are ribbed; the lower one is surrounded by a rim provided with a spout for the separation of the expressed liquid; the upper block is fitted with an iron cap, fastened with india rubber, to receive the end of the screw. The blocks are unacted on by chemicals, can be readily cleaned, and will withstand considerable pressure.—Ber. d. Chem. Ges., 1893, 1694.

Weighing Pipette.—H. Schweitzer describes a new form of apparatus for weighing liquids for analytical purposes. In appearance it resembles an ordinary bulb pipette. The suction tube is extended beyond the point where it joins the bulb, and terminates in a short capillary tube, bent almost at right angles, and with a very small aperture, which projects into and points towards the wall of the bulb, almost touching it. Exactly opposite this point the wall of the bulb is slightly flattened, so that the pipette may rest firmly on the pan of the balance, with the delivery tube inclined slightly upwards. The pipettes are constructed with large or small apertures in the delivery tube, according to the physical properties of the substance to be weighed, and they can be warmed directly in the flame without danger of breaking them, when the weighed substance (lard, etc.,) solidifies in the tube. The apparatus is easily cleaned by benzine and hot soda solutions, then alcohol, ether.—Jour. Am. Chem. Soc., 1893, 190.

Automatic Pipette.—E. Greiner, of New York City. This, in its con-

FIG. 25.

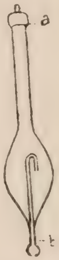


Automatic Pipette.

struction, does away not only with all danger in its use, but also effects the measuring of the liquid simultaneously with the filling operation. The upper stem of an ordinary pipette terminates in a contracted nozzle, somewhat bent over; from this upper nozzle to the lower one it holds the exact quantity for which it is marked. A second glass bulb fastened air-tight to the upper stem of the pipette is fitted with an india-rubber bulb at its upper extremity. To use it the bulb is squeezed, the lower end of the pipette is placed in the liquid, and the bulb released from pressure. As it expands the liquid rises in the pipette until it overflows from the upper end. When the bulb has fully expanded the overflow ceases, and on removal from the liquid the pipette is accurately filled. Its contents can then be delivered as desired by squeezing the rubber bulb. For the photographer it is admirably adapted, supplying him with an accurate measure of volume, instead of the grossly inaccurate graduate so generally used.—Amer. Drug. and Pharm. Rec., 1893, 246.

Landolt's Pipette.—According to J. Traube ("Physikalisch-chemische Methoden") the proper way to determine solubility is to mix the solvent with an excess of the powdered substance, and allow to stand, with frequent agitation, at a uniform temperature for from two to three hours. After allowing the solution to settle, Landolt's pipette (see Fig. 26) is suitable for drawing off a definite quantity of the solution. This should have the same temperature as the solution. The pipette may be closed by *a* and *b*. The quantity of the solution is determined by weighing, and the pipette afterwards rinsed out.—Pharm. Centralh., 1894, 124.

FIG. 26.



Landolt's Pipette.

Precipitation and Boiling Points.—R. Engel has previously shown that to precipitate one molecule of a chloride from a saturated solution at 0°, one molecule of hydrochloric acid must be added in the case of mono-valent chlorides and two molecules in the case of bivalent chlorides, the law of definite proportions thus holding good even in solutions. He now shows that the same rule prevails at temperatures other than 0°, and with double chlorides.—Compt. rend., cxvii., 485.

Standard Temperature for Sp. Gr.—D. B. Dott, in Pharm. Jour. Trans., 1894, 632. For the accurate determination of the specific gravity of a liquid, the most suitable temperature is 0° C., chiefly because it is easy to obtain and maintain that temperature correctly by immersing the vessel containing the liquid in melting ice. For practical purposes, however, what is wanted is not extreme accuracy, but sufficient accuracy, with the maximum of convenience. Hence the specific gravity of a liquid is usually referred to the ordinary temperature, which has come to be generally regarded as 60° F. There is, however, no absolutely fixed rule in this respect. The legal standard for determining the measures of capacity is 62° F., and in looking over such a book as Watts' Dictionary one sees all manner of temperatures, from 10° to 20°, in the references to the authorities quoted. There may be a sense in which 60° F. is the normal temperature; If we were in the habit of working out of doors it might perhaps be so regarded; but the average temperature of a laboratory must be decidedly over 60° F. Besides, the question of what constitutes the average temperature of a laboratory is not the chief consideration in the matter under discussion. In the very usual methods of determining specific gravity by means of a bottle with perforated stopper, or by the ordinary form of sprengel-tube, it is of no consequence that the temperature should fall in the course of weighing, but it is decidedly objectionable that the temperature should rise. Not only so, but while it is always easy to slightly warm a liquid, it is difficult and troublesome in summer weather to cool the liquid to 60°. What I wish to submit is that in future determinations of specific gravity, the more convenient course would be to refer the determination to 20° C., instead of 15.5° as is customary at present.

Specific Gravities and Temperature.—F. W. Fletcher (Chem. and Drug., 1893, 394). The following tables embody the results of a series of careful observations taken by means of the thermo-hydrometer, and illustrate the importance of noting the temperature at which specific gravities are taken, especially in solutions containing alcohol:

SPECIFIC GRAVITIES AT VARIOUS TEMPERATURES.

Proof Spirit.

Degrees Centigrade.	Specific Gravity.	Degrees Centigrade.	Specific Gravity.	Degrees Centigrade.	Specific Gravity.
20	.916	13	.922	6	.927
19	.917	12	.923	5	.927
18	.918	11	.923	4	.928
17	.918	10	.924	3	.929
16	.919	9	.925	2	.929
15	.920	8	.926	1	.930
14	.921	7	.926	0	.931

Rectified Spirit.

Degrees Centigrade.	Specific Gravity.	Degrees Centigrade.	Specific Gravity.	Degrees Centigrade.	Specific Gravity.
20	.834	13	.839	6	.843
19	.835	12	.840	5	.844
18	.836	11	.841	4	.844
17	.837	10	.842	3	.845
16	.837	9	.842	2	.846
15	.838	8	.843	1	.847
14	.839	7	.843	0	.848

Eucalyptus Oil.

Degrees Centigrade.	Specific Gravity.	Degrees Centigrade.	Specific Gravity.	Degrees Centigrade.	Specific Gravity.
4	.905	10	.900	16	.896
5	.904	11	.899	17	.895
6	.903	12	.898	18	.894
7	.901	13	.898	19	.894
8	.900	14	.897	20	.893
9	.900	15	.896	21	.893

Solution of Sugar.

Degrees Centigrade.	Specific Gravity.
9	1.330
20	1.325

Chloride-of-sodium Solution.

Degrees Centigrade.	Specific Gravity.
7	1.215
15.5	1.210

Specific Gravity—Relation of, to Atomic Weight.—See A. N. Doerschut, in Proc. Missouri Pharm. Assoc.

Comparative Volume and Specific Gravity of Water Referred to 15° C. as Normal Temperature.—C. O. Curtman (Pharm. Rund., 1894, 108; Pharm. Era, 1894, 392,) publishes a table to serve as an aid in calculating the volume and specific weight of water and other light aqueous solutions for a temperature of 15° C., when given for other degrees of temperature. To utilize this table *divide* the volume or specific gravity determined at a given temperature by the number found opposite that degree; the quotient will give the corresponding figure at the normal of 15° C. For instance, if the specific gravity of wine was found to be 1.020 at 25° C., then at 15° C. the same will be 1.020 divided by 0.997958 = 1.022. If, on the other hand, the specific gravity is known for 15° C., then, to determine the same for a higher or lower temperature, *multiply* by the number opposite the degree desired. Thus the measure of a volumetric normal solution at 15° C. is 1000 C.c., then at 10° C. its volume will be 1000 multiplied by 0.999412 = 999.412 C.c. Of course the figures in the table following are absolutely correct for pure water only, but sufficiently so for practical purposes as applied for ordinary saline solutions.

C°.	Volume.	Specific Gravity.	C°.	Volume.	Specific Gravity.
10	0.999412	1.000587	21	1.000115	0.998880
11	0.999504	1.000496	22	1.001335	0.998664
12	0.999611	1.000389	23	1.001563	0.998439
13	0.999729	1.000270	24	1.001798	0.998205
14	0.999860	1.000139	25	1.002045	0.997958
15	1.000000	1.000000	26	1.002301	0.997704
16	1.000158	0.999841	27	1.002565	0.997441
17	1.000310	0.999680	28	1.002839	0.997169
18	1.000507	0.999493	29	1.003118	0.996888
19	1.000700	0.999299	30	1.003409	0.996602
20	1.000902	0.999098			

Use of Hydrometers—Precaution.—Fr. Maly contends that accuracy in the use of hydrometers, so constantly employed by the pharmacist for determining the specific gravity of solutions, depends very much on the state of the spindles. He cleanses them first from coarse impurities, dust, etc., and then rubs them with a damp (but not wet) cloth. Friction with a dry cloth is useless. The cleansed instrument is then allowed to lie on a table for a time, to ensure the evaporation of any adhering moisture.—Drug. Circ., June, 1894.

Pyknometer for Determination of Soft Fats.—Z. Zawalkiewics has devised an apparatus so that as the pyknometer is filled and as it contracts it is immediately filled up.—Zeitschr. Oester. Apoth.-Ver., 1894, 265.

The Arrangement of the Specific Gravities of the Elements on the Periodic System.—U. Alvisi. According to the author, in the periodic system of the elements the following functions are manifested :

1. With the increasing atomic weight the equivalent of the elements referred to oxygen falls in the limit forms of the oxygen compounds.

2. The specific gravity rises up to a certain point and then descends.

From a comparison of both these functions the author infers : The relations between the specific gravities of those elements, which in the large periods are grouped symmetrically around the central element, show in the first part of the period a movement inversely proportional, and in the second part one directly proportional to the relations between the equivalent of the same elements referred to the limit forms of the same elements, *e. g.:*

Elements	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co
Equivalents	78	40	29.3	24	28.4	17.3	15.7		
Specific Gravities.	0.87	1.6	(3.8)	(5.1)	5.5	6.5	7.5	7.8	8.6

Elements	Ni	Cu	Zn	Ga	Ge	As	Se	Be
Equivalents		126	65	46.6	36	30.7	26.3	22.8
Specific Gravities.	8.7	8.8	7.1	5.96	5.47	5.7	4.8	3.1

Relations of specific gravities of equivalents	Mn/K	Cr/Ca	V/Sc	Cu/Br	Zn/Se	Ga/As
	8.62	4.06	2.2	2.83	1.47	1.04
	1/496	1/2.31	1/1.43	5.57	2.47	1.55

8.62/4.06=2.12	4.06/2.2 =1.84	2.83/1.47=1.92	1.47/1.04=1.41
4.96/2.31=2.14	2.31/1.43=1.61	5.53/2.47=2.23	2.47/1.55=1.59
Diff.....=0.02	Diff. ...=0.23	Diff. ...=0.31	Diff. ...=0.18

In the second small period the sum of the specific gravities of the elements on one side of the central element is equal to the corresponding sum of the other side, *i. e.*, the matter is arranged on both sides of the central element with the same mean density, *e. g.*:

ONE SIDE.

Na	sp. gr.	0.98
Mg	"	1.74
Al	"	2.64
Sum	"	5.36

OTHER SIDE.

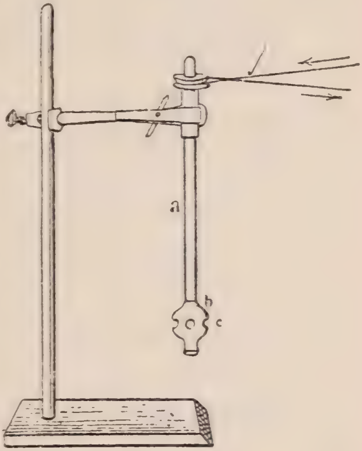
P	sp. gr.	2.2
S	"	2.07
Cl	"	1.3
Sum	"	5.57

In the large periods on both sides of the eighth group there are on the right and the left each three elements whose joint sp. gr. is the same. Of the three elements of the eighth group, two give, together with the first four of the large period, the same total sp. gr. as the third element with the last four of the large period; *i. e.*, the eighth group has, to a certain extent, the function of equilibrating the less dense matter of the first part of the large period with the sp. gr. of the second part.—R. Acc. dei. Lincei and Beiblätter der Annalen; Chem. News, 1894, 127.

Importance of Sterilization in Pharmaceutical Operations.—Degener considers the necessity of sterilizing such aqueous fluids as infusions, eye waters, gargles, and all those containing sugar.—Chem. Zeit., 1893, 1389.

Stirrer.—O. N. Witt. The stirrer consists of a pear-shaped glass bulb, 20–25 Mm. in diameter; the top end is fused to a glass rod, the other is open; the bulb is pierced with four holes, each the size of the open end, and arranged symmetrically around its greatest diameter; it is operated by a turbine, at a speed of 5000 turns per minute, in the ordinary manner. Liquids of very different specific gravity may be intimately mixed by means of this instrument without any danger of loss, even when the vessel is almost full.—Ber. d. Chem. Ges., 1893, 1694.

FIG. 27.

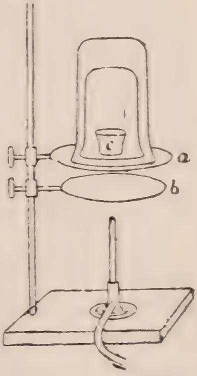


Stirrer.

Storage of Drugs and Chemicals.—C. F. Henry in this note draws attention to the practice of adding new stock to old in hand bottles, stock pots, etc. He specially referred to waters, concentrated infusions, ointments, fixed and essential oils, pills, extracts, and vegetable and metallic powders, pointing out the liability of each class to decompose, in some cases to become inert, and in others to develop highly poisonous properties, if allowed to lie too long in stock. He pointed out the inadvisability of mixing new and old stock. He concluded by emphasizing the duty of pharmacists, who, possessing more knowledge of the nature, characteristics and properties of the substances in which they dealt than any other trade, should be most careful to keep these in a state of strength and purity, as near perfection as possible.—Pharm. Jour. Trans., 1894, 885.

New Apparatus for Sublimation.—G. Oddo. The following method gives good results in the purification of substances by sublimation. The substance is placed in a small beaker, which is fitted into a hole in a piece of asbestos card standing on a ring support; a beaker in which the sublimate collects is then inverted over this, and a third beaker is placed over the second. The beaker containing the substance is heated by radiation from a second asbestos disc placed below it, to which heat is applied by means of a Bunsen burner.—Gazzetta, 1893, 313; Jour. Chem. Soc. (Abs.), 1894, 134.

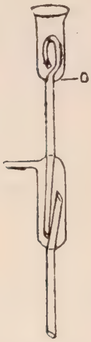
FIG. 28.



New Apparatus for Sublimation.

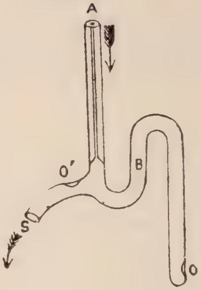
Safety Tube.—A. Bidet (Compt. rend., 1893, 478). The safety tube allows of the introduction of an acid, whilst any gas that is evolved escapes through the lateral tube. If the pressure inside the vessel becomes high, the liquid in the cylindrical bulb is driven up into the funnel and the gas escapes through the bent tube without projecting the liquid from the funnel; when the pressure falls, the liquid runs back from the funnel into the bulb.—Jour. Chem. Soc., 1894, 231.

FIG. 29.



Safety Tube.

FIG. 30.



Constant Level Syphon.

Constant Level Syphon.—This is obtained by attaching a lateral tube, *O' S*, to an *S* tube a little above the lower bend. The lower branch is placed in the vessel in which the constant level is to be maintained, and the water is brought in through the upper vertical branch, *A*. When the level of the liquid in the vessel falls below the lower bend, the syphon acts in the direction *B O;* if it rises higher, the syphon acts in the direction of *B S*.—Ibid.

Mercurial Thermometer for Temperatures up to 530° C.—M. v. Recklinghausen. The thermometer is made of Jena glass No. 59 iii, and contains compressed carbonic anhydride. The author has made a number of determinations of the boiling points of sulphur, mercury, and of various organic compounds; the corrected numbers agree tolerably closely with the values obtained with the air thermometer.—Ber. d. Chem. Ges., 1893, 1514. See also Ibid., 1815.

Thermometer of Alloy of Hg, Na, K.—Baly and Chorley describe a thermometer which can be employed for all temperatures between —8° C. and 650° C. The instrument is made on the same principle as the ordinary mercurial thermometer, very hard glass being employed, and an alloy of mercury, with potassium and sodium, serving for the expanding liquid. This alloy has the advantage of being liquid through a very much greater range of temperature than mercury, its freezing point being —8° C. and its boiling point 700° C., whereas mercury freezes at —40° C., and boils at 357° C.—Ber. d. Chem. Ges., xxvii., 470.

Toluol Thermometer.—There has lately been introduced a thermometer in which the mercury is replaced by toluol. It answers admirably for low temperatures, as its freezing point is about —70° C., boiling point being +170° C. The toluol is colored black, which renders the thread easy to distinguish. The co-efficient of expansion is five times greater than that of mercury, also its density is very small, about 0.870; this allows the use of a larger bulb and capillary tube. Because of their comparative cheapness they promise to supplant the mercury thermometer for general uses. —Alumni Jour., 1894, 66.

Electric Indicating Thermometer.—M. Barillé describes an ingenious application of electricity as an aid in preserving a constant temperature during laboratory operations. An ordinary mercurial thermometer has the upper half of the stem somewhat enlarged in diameter, the lower, narrow portion alone being graduated. A fine platinum wire (*a*) is sealed into the bottom of the bulb, so that one end projects into the mercury, and a similar wire (*b*) is fixed into the upper part of the stem, running the whole length of the thickened portion. A third platinum wire (*c*) extends from a point about one-third the distance down the narrow, graduated part of the stem, up past the free end of the second wire as far as the middle of the latter, round which it is then twisted in a spiral, whilst a steel needle to serve as an index is soldered to its extremity. Finally, the air in the upper part of the stem is replaced by orthotoluidine—which boils at 200°, freezes at —20°, and does not appreciably effect the mercury; the opening is sealed, and the thermometer fixed in a suitable copper frame, the lower part of which may readily be introduced into the openings in drying ovens, etc. A small permanent horseshoe magnet is next placed so that its poles are opposite the ends of the index, which it maintains in position by its attractive influence, so that the movable wire *c* becomes practically a prolongation of the fixed wire *b*, along which it slides by means of the spiral. By sliding this magnet up or down the side of the thermometer tube, a corresponding movement of the wire *c* also takes place. The free extremities of the wires *a* and *b* are attached to binding screws, which are in turn connected with an electric bell and battery. Now, when the surrounding temperature is sufficiently high to expand the mercury until it comes in contact with the lower extremity of the wire *c*, the circuit is immediately closed and the bell rings; and by regulating the position of the permanent magnet, and consequently the steel index on the upper end of the wire *c*, it is possible to fix the maximum temperature at any point desired.— Comp. rend., cxviii., 246.

Improvement in Thermometers.—Mr. Lupin, of Munich, has recently called attention (Rev. Scient.) to two thermometers that are free from certain inconveniences presented by those filled with alcohol. One of them is obtained with sulphuric acid diluted with water. According to the experiments of Sohncke, the quantity of water abstracted by distillation in the thermometric tube is trifling, even when the free extremity is surrounded with ice, and, what is still more important, this small quantity of water is reabsorbed in a short time. The expansion of the liquid column is nearly constant. Mr. Vogel made use of this apparatus in the course of an expedition to Brazil, and obtained very satisfactory results with it.

The other liquid is a solution of chloride of calcium in spirits of wine (10 to 15 per cent. of the anhydrous salt is the best proportion). This is especially recommended for clinical uses on account of its pronounced color, which facilitates readings. It gives no rise to error, either, in consequence of distillation, and, besides, presents the advantage of taking the temperature of the body very rapidly, say in about three minutes. The regularity of expansion, although less perfect than with sulphuric acid, is satisfactory between 0° and 50° C.

These two solutions do not solidify, even at the temperature of evaporation of snowy carbonic acid; and, with the proportion of salt indicated, there is no deposit in the reservoir.—West. Drug., 1894, 14.

Thermometers for Low Temperatures.—Report by P. Chappuis to the Swiss Soc. of Nat. Science. Comparisons of many instruments carefully examined showed that thermometers filled with toluene, pure and well dried, agree with each other to nearly $\frac{3}{100}$ of a degree as far as —70°. Various samples of alcohol, considered pure, gave very great differences; for example, between alcohol purified in the laboratory of the Ecole Normale, under the management of M. Joly, and a sample of pure alcohol from the firm of Billault, a difference of 1° was found at —70°. The following table gives the readings of toluene and alcohol thermometers for different temperatures of the hydrogen thermometers:

Hydrogen.	Toluene, Graduated from 0° to 100°.	Pure Alcohol, Graduated from 0° to 30°.
—100	100.	30.
+50	26.9	0.
0	0.	0.
—10	—8.54	—9.31
—20	—16.90	—18.45
—30	—25.10	—27.44
—40	—33.15	—36.30
—50	—41.08	—45.05
—60	—48.90	—53.71
—70	—56.63	—62.31

We find that the toluene, like alcohol, contracts less and less as the temperature falls.

The above table might lead one to suppose that there is less difference between the alcohol and hydrogen thermometers than in the case of toluene; this difference is due simply to the fact that the points selected for its graduation are much nearer.

Other liquids are being tried, but as yet toluene seems the best. Considering the increasing importance of researches at low temperatures, physicists will be glad to be able to attain, easily, an accurateness of $\frac{1}{20}$ of a degree.—Drug. Circ., 1893, 256; from Chem. News, trans. from La Nature.

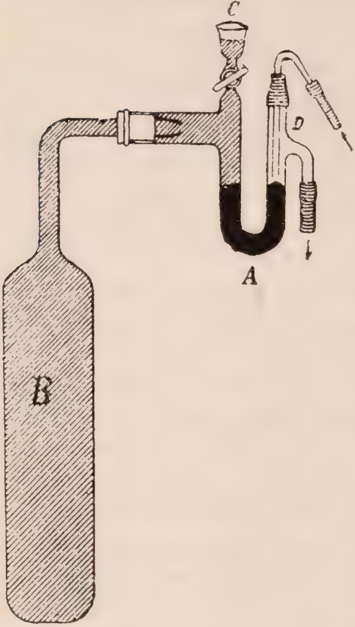
Certification of Thermometers.—The Secretary of Yale University Observatory refers to correction of thermometers, and then refers to the construction of registering clinical thermometers, which are frequently overlooked by makers and users of them.

"In those forms where the index is a short column of mercury—one-third to one-half an inch in length—separated from the rest of the mercury by a small bubble of air, the index is often lost by being thrown down into the bulb, the bubble escaping into the attenuated atmosphere of the tube, and when the index is restored the separating bubble is not likely to be of the same dimensions, and the temperature indications will not be the same as with the former bubble. The difference in the lengths of the tube occupied by the old and new bubbles will account, approximately, for the difference in the readings. The bubble should always be as small as is consistent with its function of separating the columns of mercury. The tube should extend sufficiently beyond the maximum readings required, that the compressed atmosphere at the top of the tube may not force back the index, when the support of the mercury in the bulb is withdrawn by cooling.

"In those forms where the 'indestructible index' is maintained by a 'trap' near the bulb, the various constructions of this trap may, at certain points, cause the index to drop irregularly when the mercury below the trap has contracted, or may occasion a motion of the index by jumps; in fact, in most of the reliable instruments of this form, it is merely a question of the number of jumps taken by the index in rising one degree; most of those in which the index rises perfectly smoothly and without jumps will justify the suspicion that the index will drop as soon as the mercury in the bulb contracts from the trap. While the index is rising freely the motion may appear continuous, but when the index is within a degree or two of coming to rest and rising slowly, the jumps may, usually, easily be counted. Our recent practice has been that, when these jumps average 0.1° or less, and the readings repeat themselves throughout within the prescribed limit of accuracy, the usual certificate is given; if the jumps average more than 0.1° and less than 1/6°, the readings repeating themselves as before, we modify the certificate by making the limit of accuracy '0.2°' on the same certificate form; and when the jump averages more than 1/6, we give no certificate. The process of producing the trap leaves its walls in a somewhat unstable condition, so that moderate concussions may cause particles of glass to separate, which particles, acting as a plug, may temporarily sustain the index, which, when the plug is dislodged, may drop. The contraction here is so small, and the particles of glass so fine, that it is not always easy to detect them. The same dropping of the index may be due to the varying effect of air in the trap."—Pharm. Era, 1893, 449.

Traube's Thermostat.—In his work entitled "Physikalisch-chemische Methoden" J. Traube illustrates a valuable form of a thermostat shown in Fig. 31. It consists of a U-shaped tube *A* to which is attached, by means of a rubber stopper, a medium small cylindrical tube *B*, which is filled either with an oil or with a concentrated solution of calcium chloride. A sufficient quantity of mercury is then poured in through the funnel. The air in the space between the mercury, cylinder *B*, and the funnel *C*, is then entirely replaced either by oil or by calcium chloride solution. The influx and egress of the gas to the burner is shown by the arrows. The cylinder *B* should be thrust into the water bath or drying closet, which is to be maintained at a uniform temperature.—Pharm. Centralh., 1804, 124.

FIG. 31.



Traube's Thermostat.

Viscosimeter.—D. B. Dott constructs one from a Y-tube, in which one orifice is more contracted than the other, or by passing two small tubes (with similar contractions) through a cork in an inverted wide-mouth bottle, in the bottom of which an opening has been made. It seems evident that the instrument might be standardized by fixing the amount of water that should flow from each tube in a definite time. In this arrangement the time is, of course, disregarded, the volumes of liquid being measured, and the smaller number divided by the greater. In this way a co-efficient is obtained which bears some relation to the viscosity, but the differences among liquids are not nearly so great as those indicated by the ordinary method. The following are some of the results obtained:

Water	114 C.c. and 74 C.c.	indicating	viscosity	64
Sperm oil	114 C.c. and 89 C.c.	"	"	78
Rape-seed oil	93 C.c. and 78 C.c.	"	"	83

These numbers are quite different in degree from those obtained by the ordinary method. Indeed, this note is the merest suggestion. If a satisfactory viscosimeter could be constructed on these lines, one possible source of error in the usual method would be eliminated, viz.: the varying adhesion of different liquids for the material of which the viscosimeter is composed.—Pharm. Jour. Trans., 1894, 848.

Preservation of a Constant Level in Water-baths and for the Extinction of the Flame in a Dried-up Water-bath.—Concerning the former part of the invention no particulars are given. As regards the second portion there is introduced into the gas-pipe a metal cock, the outflow pipe of which is prolonged for from 10 to 15 Cm., and is loaded at its end with a weight. This rests freely upon one end of a flat piece of iron, wedged between the water-bath and the tripod in such a manner that, as the bath becomes gradually lighter, the iron falls and turns off the gas-cock.—Chem. Zeitung, 1894.

Vacuum Water-Baths for Temperatures of 100° C. and Upwards.—As an improvement upon the "toluol vacuum bath" of Herzfeld, J. Baumann and W. Horn have devised a bath with which they obtain the same results, and which can be used at pleasure to obtain a temperature of 100° C. or over, the maximum temperature being limited only by the strength of the material used. The bath is composed of strong copper and is cylindrical in form. The inner chamber is 10x4 inches, and is fitted with a perforated shelf about one inch below the centre. The outer chamber is 6x11½ inches, and is fitted with a very well ground safety valve (weighted) and a guage glass at the end to see the level of the water. There are two tubes connected with the inner chamber, but having no connection with the outer. The one is for the thermometer; the other is connected on the outside of the bath with a 3-way tube. On top of the 3-way tube is placed a vacuum gauge with a stop-cock. Stop-cocks are placed on each of the other arms, the one being used for connecting with a Körting aspirator and the other with air. To use the bath, water is placed in the space between the inner and outer chamber and heat is applied. As soon as it is boiling the safety valve is closed and the weight placed on the arm. By moving the weight along the arm the water can be made to boil at any pressure desired, and consequently at any temperature above 100° C. The advantage of the bath over the toluol bath is no danger of fire, and over an ordinary water-bath is the fact that it can be used as an ordinary bath, or, by connecting one of the limbs of the 3-way tube with an aspirator, either a partial or almost complete vacuum can be obtained.—Chem. News, 1894, 245.

Volatilization of Salts During Evaporation.—G. H. Bailey has ascertained quantitatively the loss of substance in evaporating solutions of the chlorides of lithium, sodium, potassium, rubidium and caesium.—Jour. Chem. Soc., 1894, 445.

PRESCRIPTION AND PRESCRIPTION DIFFICULTIES.

Incompatibilities and Prescription Controversies.—E. L. Patch discusses this subject:

1st. From the physician's standpoint.

(*a*) The physical appearance of the product is different from that looked for.

(*b*) The therapeutic effect is a disappointment.

2d. From the pharmacist's standpoint.

(*a*) Difficulty in fixing upon the intention of the physician.

(*b*) Difficulty in supplying the remedy.

3d. From the patient's standpoint.

(*a*) Lack of faith in the prescription.

(*b*) Failure to understand the physician's instructions.—Amer. Drug. and Pharm. Rec., 1893, 412; New Eng. Drug., 1893, 332. Read at Am. Med. Assoc., June, 1893.

Analysis of 12,000 Prescriptions.—Comparison of Mr. Martindale's work (prescriptions dispensed in Aberdeen, Bournemouth, Carlisle, Cork, Oxford, and his own pharmacy in London) and that of the "Chemist and Druggist" (prescriptions obtained from over 100 towns in the United Kingdom). The following are "the dozen highest scores" in Mr. Martindale's list and in "Chemist and Druggist" (which they have increased to the 12,000 ratio to make the figures strictly comparative):

"Chemist and Druggist."		Martindale.	
1. Spt. chloroformi	1,023	1. Spt. chloroformi	1,117
2. Potass. brom	860	2. Tr. nucis vom.	991
3. Vin. ipecac.	834	3. Glycerinum	875
4. Spt. ammon. arom.	678	4. Sodii bicarb.	807
5. Quininæ sulph.	673	5. Syr. aurantii	796
6. Sodii bicarb.	666	6. Spt. amm. arom	675
7. Ammon. carb.	660	7. Quin. sulph.	598
8. Liq. ammon. acet.	655	8. Vin. ipecac.	504
9. Glycerinum	654	9. Potass. bicarb.	463
10. Syr. aurantii	642	10. Aq. chloroformi	437
11. Tr. nucis vom.	558	11. Ammon. carb.	397
12. Potass. bicarb	534	12. Acid. boric	390

The most notable point in this comparison is the absence of potassium bromide from the second column; it scores only 365 in Mr. Martindale's analysis. Otherwise the comparison shows that the analyses are remarkably alike.—Chem. and Drug., 1894, 737.

——— A further comparison shows that in regard to medicines as a whole, little or no change has occurred during the past eight years. That is to say, the greater proportion of those in the recent list are closely comparable with the same articles in that of 1886. But there are many instances of change, and it is in this that periodical analyses of prescriptions are valuable. In his preface Mr. Martindale gives a list of official preparations which have not been once ordered in his 12,000 prescriptions. There are 126 articles in this list, and we find that 79 of these were not ordered in 1886, while of the 47 which were ordered none occurred more than four times in the 10,000.

Having eliminated from the analyses all data which have been influenced by local peculiarity, we come to those medicines which have gone up or down during the eight years since the C. and D. made their analysis. Those which seem to be on the down grade are:

	1886.	1894.
Acid. gallic.	33	9
Adeps præp.	50	16
Ammon. carb.	551	397
Butyl-chloral hydras	29	15
Chloral hydras	141	82
Copaiba	22	3
Creosote	27	13
Hyd. c. cretâ	238	155
Jalap.	48	3
Ol. pini sylv.	16	6
Pot. brom.	717	365
Pulv. cinnam. co.	66	37
Pulv. jalapæ co.	30	11
Rhei rad.	229	97
Spt. æther. nit.	413	272
Terebene	51	28

Practically the whole of these changes can be accounted for. The medicines which have come into use since 1886 are fairly numerous. We mention most of them, with their scores, which compare with *nil*:—Analgene, 9; antifebrin, 8; apiol, 6; apomorphine, 12; Franz Josef water, 6; bismuth salicylate, 12; gelatine capsules, generally; emp. capsici, 17; eucalyptol, 6; homatropine hydrobromate, 44; ol. pini pumil., 27; paroleine, 19; palatinoids, various; piperazine, 21; salacetol, 9; salol, 28; sulphonal, 85; and ung. hamamelid., 15. Some of these were known eight years ago, but were not prescribed. The marked advances during the period are:—Aloin, from 33 to 65; caffeine citrate, from 5 to 37; calamine, from 4 to 26; cocaine and its hydrochlorate, from 21 to 218; elixir aurantii, from 1 to 52; elixir simplex, from 1 to 32; euonymin, from 60 to 115; ext. glycyrrh. liq., from 31 to 102; ferri sulph. exsicc., from 7 to 52; iodoform, from 23 to 67; lanoline, from 14 to 147; menthol, from 6 to 51; ol. eucalypti, from 27 to 63; salicin, from 58 to 166; sodium sulphate, from 3 to 113; and vaseline, from 143 to 234. In some of these cases the increase is, no doubt, due to the publication of formulæ either in the B. P. or B. P. C. Formulary, and in others growing popularity and better knowledge are the chief causes of increase. Mr. Martindale has evidently not considered the proprietary medicines prescribed, which the C. and D. has done.—Ibid., 771.

Dispensing Percentage Prescriptions.—C. A. Macpherson (Pharm. Jour. Trans., 1894, 884) divides them into two classes: (1) those in which no parts are added to 100, and those (2) in which no parts are contained in 100 parts. He gives illustrations.

Uniform Price Scale for Prescriptions.—C. S. Ingraham, in Amer. Drug. and Pharm. Rec., 1894, 22. Concerning the price mark for copies or originals returned to the customer, the author suggests that every pharmacist should put the price in plain figures on the face of every copy or original prescription that goes out of his store, and the price also on the *back* of the same prescription in Roman numerals.

The position of these marks would be immaterial, as the observant eye of the dispenser will detect them readily enough. Then the smart customer should lose his occupation of altering the face value of the prescription by changing the figures, for having changed the figures in his favor on the face of the prescription, he would never stop to observe the check mark on the back or bottom of the prescription. Being perfectly content with his own shrewdness, he would put it away in his pocket chuckling over the little game he would come on the next druggist.

Any alteration in price would be detected by this means and the pharmacist be protected from unjust and damaging charges of extortion or excessive profits from an all too credulous and already too suspicious public.

——— G. Cutts (Ibid.), proposes the following as a general scheme for a price-scale:

Powders:	Simple	10c., 15c., 20c.	25c. to 30c.	30c. to 35c.
		one or two.	four or six.	ten or twelve.
	Compound	15c. to 20c.	25c. to 35c.	40c. to 50c.
		one or two.	four or six.	ten or twelve.
Pills, Capsules		10c. to 15c.	20c. to 25c.	35c. to 40c.
		one to three.	four to six.	ten to twelve.
Mixtures:	Liquids, Internal.	20c. to 25c.	30c. to 35c.	40c. to 50c.
		one oz.	two or three oz.	four oz.
	Lotions	25c.	35c. to 40c.	50c. to 75c.
		two oz.	four oz.	eight oz.
	Ointments	25c. to 30c.	35c. to 40c.	50c. to 65c.
		one oz.	two oz.	four oz.

——— Editorial in Pacific Drug Rev., Aug., 1893. The writer's experience strengthens the belief, that a uniformity in prices, suggested in the above-mentioned paper, is not only impracticable but impossible, and that such a movement would not receive the support of one pharmacist in fifty.

It is doubtless well to have such a scale as suggested in each individual pharmacy for the guidance of the numerous employees of the establishment, each scale arranged according to the demands of the situation in each individual case. At the same time such scale would, in all probability, be absolutely worthless in another pharmacy but a few blocks distant.

The proposition that on all copies of a prescription given to customers the prices charged for the same be marked in plain figures, is certainly an excellent one. As a result of this, however, it is altogether likely that some unprincipled druggist would take advantage of the same by charging a lower price than previously paid, in order to affect the confidence of his customer in the other pharmacist. As it is, if he is unable to ascertain the price previously charged in compounding a prescription from the copy itself, it is the invariable custom to make a price so low that it will certainly be under that charged for the original.

The Proper Keeping and Dispensing of Poisons.—A. N. Doerschuk. The one recourse is education. The beginner in pharmacy should be taught first of all that his calling is indeed a profession, hence cannot hold out the promise of great wealth ; and if money-getting be his chief ambition, he should rather embark in some more lucrative vocation.

The novice should be instructed as to the responsibility of the position he will presently occupy. He should be impressed with the great value of each human life, whose salvation or destruction may hang upon his skill. He should know the devious ways of human nature. In modern pharmacy a college education has become of necessity a permanent factor. But the fact is, a college training is something that should follow rather than precede the acquirement by the apprentice of a good general idea of the druggist's daily life and environment. This knowledge can best be obtained by several years of active service in a drug store, where everything is done with precision and care, and where able graduates are in charge. After the beginner has gained this knowledge by serving for a time as apprentice to a well qualified apothecary, and has been carefully drilled at college in the technical and theoretical branches of pharmacy, then, and then only, is he qualified to assume the responsibilities devolving upon the pharmacist. The State could feel no hesitancy in placing the entire privilege of dispensing poisons, under proper restrictions, in the hands of a class of men educated and trained in the manner indicated with complete safety and satisfaction to all concerned.

Such a process of education cannot be accomplished in one generation. The profession of to-day must first climb to this standard, and then with untiring zeal strive to elevate its successors. The task in view is by no means an easy one. It will require a general concerted effort on the part of all progressive pharmacists, and in many cases the enactment of new State laws.—Drug. Bull., 1894, 154.

Poison Bottles.—H. M. Wilder considers the idea of W. C. Bakes most practical. He had labels printed with a broad border, which was painted with mucilage or any other adhesive substance, and coarse sand or powdered glass was sifted over it. Such labels, with a decidedly rough-feeling border, were always used for poisons and "externals." People quickly learned that a rough feeling on getting hold of a bottle indicated dangerous contents. When the label was soaked off, the bottle, if clean, might be used for other liquids. Although the idea is not above objections, it has got at least this advantage, that people would always associate the rough bottle with danger, because they would never use or get a rough bottle for other liquids. It is evident that a piece of number two sandpaper, pasted on the back of the bottle (larger bottles, both back and front), serves as well, though not so elegant.—Drug. Circ., 1894, 75.

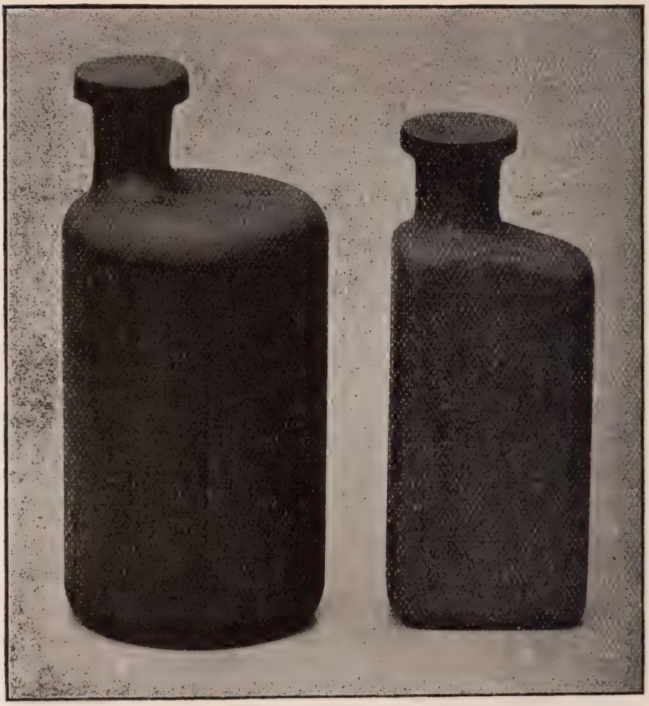
Poison Bottles.—A correspondent of the London Illustrated News suggests the passage of a law requiring all poisons to be dispensed in bottles provided with a glass screw stopper. He thinks that when a bottle was met with, the stopper of which could only be removed by unscrewing, that fact would naturally act as a warning.—Ibid., 130.

——— Luminous stoppers appear to be growing into favor with Dublin pharmacists, several establishments having recently adopted the inexpensive and precautionary plan of ornamenting with luminous paint the stoppers of such bottles as contain poisons.—Chem. and Drug.; Drug. Circ., 1894, 58.

——— W. H. Holden (Bull. Pharm., 1893, 105) offers the following:

1. It may be observed by referring to any glassware price-list that the necks of all bottles are in the centre of the ends or sides. By moving the

FIG. 32.



Poison Bottles.

neck well to one side we have a bottle in appearance uncanny, indeed, but certainly striking.

2. A number of bottles, manufactured in accordance with the illustrations now found in lists, will make a package either perfectly square or square with round corners; hence, the adoption of any shape that will not yield this style of package would be distinctive.

3. The side-neck may be combined with any of the above shapes.

4. Inasmuch as the blue color, the word "Poison," the skull and cross-bones, the words "Not to be Taken," and the sharp or prickly exterior, are now associated with toxic drugs and preparations, any or all of these expedients could be employed, thus augmenting the deviation from the conventional containers.

The adoption of plan No. 1 would retain all the main points of any style previously adopted by any manufacturer, wholesaler, or retailer, as a package for the output of pharmaceutical preparations.

Plans Nos. 2, 3 and 4 would be of value only if the adoption of a uniform style of bottle for poisons were determined on by pharmacists or enforced by law.

Compulsory Use of Poison Bottles.—The New York Legislature proposes to make the use of poison bottles compulsory. The bill practically consists of one clause, viz.: "No person, firm, or corporation shall, after October 1, 1894, either sell or give away, or cause to be sold or given away, any poison or poisonous substance in liquid form except in fluted bottles labelled in the manner heretofore provided by the laws of the State. Each person or corporation violating any of the provisions of this Act will be guilty of a misdemeanor." It is said that there is little hope of the bill passing into law.—Chem. and Drug., 1894, 756.

Poison Bottle.—R. W. Councell suggests the following: A cork is simply cut in two, horizontally, near the small end, and the entire cork threaded on a string, with a knot below the lower segment of the cork. The free end of the string is attached to a label bearing the word poison.

On the cork being fitted to the bottle containing poison there are several things which attract attention, even in the dark. First, the string; second, the label (bearing the word poison); if these are not noticed, then if the cork is seized and pulled only the upper segment comes away, sliding on the string, and the contents of the bottle cannot be poured out. It is necessary to pull on the string itself in order to remove the cork entire.—Ibid., 277.

Poison Bottles.—Editorial in Chem. Drug., 1894, 46.

Dispensing Methods.—Based on suggestions by A. L. Doran.—Chem. and Drug., 1894, 695.

Jottings from the Dispensing Counter.—F. A. Goodwin deals with prescriptions containing incompatibles and the duty of the dispenser in dealing with such, classifying them under two headings.

1st. Those in which the decomposition was of such a nature as to deprive the resulting mixture, lotion, &c., of the qualities intended by the prescriber.

The second class of incompatibles were those in which the decomposition had probably little to do with the effect of the mixtures, and the difficulty —if any—lay in their preparation.—Brit. and Col. Drug., June, 1894.

Incompatibility.—Lecture by James Kennedy.—Amer. Drug. and Pharm. Rec., 1894, 91; Drug. Bull., 1894, 158.

Careless Prescribing.—An illustration of careless writing of some physicians.—Amer. Drug. and Pharm. Rec., 1893, 268, 275.

Notes on Practical Dispensing.—Notes on emulsions of castor oil, menthol, turpentine; making emulsions with yolk of egg; pills containing carbolic acid, essential oils; soluble copaiba.—Chem. and Drug., 1893; Pharm. Era, 1893, 153.

Dispensing Notes.—R. H. Mitchell in Pharm. Jour. Trans., 1894, 742.

℞.	Aristol	gr. x.
	Ol. Theobrom. q. s. fit buginar.	

These can be made with Ol. Theobrom. gr. xii., but a sticky and tough mass is formed, which is not very soluble. A better preparation is obtained by using Ol. Theobrom. gr. x and Ung. Cetacei gr. iii. They are also more easily prepared if moulded in tinfoil.

℞.	Ferri alumin	gr. iii.
	Ol. theobrom	q. s. ft. suppos.

This is an unusual medicament in a suppository. They require great care in the manipulation, as over-heating causes the salt to aggregate at the point of the suppository.

℞.	Cocaine	5 p. c.
	In parolein	℥ i.

The cocaine dissolves with heat, but is mostly thrown out on cooling. The prescriber sanctioned the substitution of almond oil.

——— T. Tickle (Ibid., 1893, 473). The following mixture dispensed in the usual way deposited large crystals a few hours after preparation, in such a way as to render it impossible for the patient to take the contents in equal doses:—℞. Ferri et quininæ citratis, ℈ii; potass. citratis, ʒii; acid. citrici, ʒi; aquam ad ℥vi. The results of a few experiments showed that the crystals consisted of acid citrate of quinine, $C_{20}H_{24}N_2O_2,H_3C_6H_5O_7$; and that in about twenty-four hours practically the whole of the quinine was separated from the mixture in this form. It was suggested that the formation of large crystals indicated that the acid citrate of quinine was formed only gradually, whence it followed that the agent which turned it out had a tendency to form a double salt with the ferric citrate, not much greater than that of the quinine citrate. This might partly explain why precipitation between citrate of potassium and citrate of iron and quinine occurred only occasionally. But it was in some instances due to the presence of small quantities of other acids. In one instance no separation took place in the mixture; and this was found to be due to the presence of sulphuric acid, which had found its way into the mixture with the citrate of iron and quinine. The best way to dispense the mixture was to dissolve the ingredients in the smallest possible quantity of water and set aside for some time. When the separation of crystals seemed complete they should be rubbed into a fine powder, which could then be readily distributed in the bottle by shaking. This method, however, was not altogether satisfactory, for often the crystals continued to be formed, or the small crystals suspended aggregated together. If possible, the case should be notified to the prescriber, who might be able to materially alter the form of the prescription, or by permitting the addition of a small quantity of some such salt as ammonium chloride, enable the dispenser to send out the medicine clear and without liability to deposit.

Dispensing Notes.—F. Walker (Ibid., 1894, 820).

℞.	Liq. strychninæ	℥ ss.
	Acid hydrobromic. dil.	℥ ss.
M.	M. 20 pro dosi.	

℞.	Liq. strychninæ	℥ ss.
	Potass. iodid	ʒ ii.
	Aquam ad	℥ iii.
M.	ʒ i pro dosi.	

In the first case the strych. hydrochlor. is probably salted out through excess of acid. It is soluble on dilution, also on heating, but recrystallizes on cooling. In the second case the alkaloid is thrown out by the potass. iodid.; this may be retarded by mucil. tragac. Mr. E. Williams mentioned a similar difficulty he had experienced with a mixture containing liq. strych., acid sulph. dil., and quin. sulph. As Duncan had pointed out, the crystals deposited in this case proved to be strych. hydrochlor., salted out by excess of acid sulph. dil. On further addition of acid, however, double metathesis occurred, strych. sulph. being deposited. If liq. strychninæ B. P. be made according to the "parts" formula, the salt was almost certain to crystallize out, but if made from the "weights and measures" formula the solution was stable. He suggested that in the next B. P. the stable salt, strych. hydrochlor., be used in place of the alkaloid and acid, 10 grs. of strych. hydrochlor. being equivalent to 9 grs. of alkaloid.

Pilocarpine Incompatible with Calomel.—It has frequently been observed that mixtures of pilocarpine salts and calomel turn black when moistened with water. This change is now explained by A. Schneider, by the formation of a double salt of the alkaloid with mercury chloride, metallic mercury being separated. When the mixture is treated with water, the double salt passes into the filtrate and evinces a peculiar behavior towards solution of potassium iodide, which salt does not ordinarily precipitate pilocarpine salts. There arises a precipitate due to the formation of the double salt mercury and potassium iodide from the potassium iodide and the mercury chloride in the solution.—Chem. Ztg., 1893, p. 248.

Calomel and Potassium Bromide.—L. N. Thompson (Chem. and Drug., 1894, 210).

Potassium bromide	grs. x
Calomel	grs. iii.

Ft. pulv. mitte tales xii.

As soon as the ingredients are rubbed together in a mortar the mixture begins to darken, and if water is added the powder instantly becomes grayish black. It was found that if the potassium bromide was powdered and then dried so as to remove interstitial moisture before being mixed with the calomel, there was no darkening, but the same change took place instantly on the addition of moisture. The darkening is due to the separation of metallic mercury from the calomel, and is explained by the following equation:

$$2\mathrm{HgCl} + 4\mathrm{KBr} = (\mathrm{HgBr_2 2KBr}) + \mathrm{Hg} + 2\mathrm{KCl}.$$

The prescription, therefore, is an example of a dangerous incompatibility, as the mercuric salt formed is a powerful poison. There is no method by which the decomposition can be avoided, and calomel and potassium bromide should never be prescribed together.

Calomel and Tincture of Iodine.—(Ibid.)—

Tinct. of iodine	℥ i.
Calomel	grs. xx.

This curious prescription had been ordered and directed to be painted on a glandular swelling on the neck. What the prescriber desired seemed difficult to understand. On adding the calomel to the tincture of iodine the latter was nearly decolorized, and the calomel became of a bright red color. The decomposition was investigated and explained as follows. The calomel and potassium iodide react thus:

$$2\mathrm{HgCl} + 4\mathrm{KI} = \mathrm{HgI_2 2KI} + \mathrm{Hg} + 2\mathrm{KCl}.$$

Cocaine and Borax in the Presence of Glycerin.—The precipitate formed by borax in an aqueous solution of cocaine hydrochlorate disappears on the addition of glycerin. This reaction presents a remarkable phenomenon on the application of heat. The solution becomes turbid, the turbidity appearing first at the surface, and gradually extending downward, until the entire mass is affected. On cooling the turbidity disappears completely. Lewy (Rép. de Pharm., 1893, 509,) thinks the reaction may serve for the determination of the presence of cocaine. He has thus been able to recognize 1 part of cocaine in 1000 parts of a solution of the same.

Dangerous Incompatibles.—A. Jorissen (L'Union Pharm., 1894, 163) cites a formula, dangerous to prepare and to keep, in which potassium chlorate is associated with sodium salicylate, cinchona powder and charcoal. To reduce the danger to a minimum, he advises to first mix the last three substances, and to pulverize the chlorate separately, and then admix it carefully on a sheet of paper, with a feather. Regarding the permanganates, the author recalls the well-known fact that zinc permanganate presents the same danger as potassium permanganate. As a rule, these compounds should never be associated with organic matter. We should carefully avoid triturating these compounds in the presence of organic products or reducing agents. We should also guard against dissolving permanganates in certain inflammable liquids, such as glycerin; the danger may generally be averted by previously dissolving the permanganate in a sufficient quantity of water. To dispense potassium permanganate in pills, white argil and anhydrous lanolin should be used as excipients. Chromic acid and potassium bichromate are also liable to cause accidents in the presence of organic matter (solid or liquid). Nitro-glycerin, as a medicamentous agent, should only be kept in the form of solutions diluted to 10–1 per cent. with alcohol or fatty oil, and preserved in small vials protected against light. Nitro-glycerin should never be triturated. Among the interesting recipes the author has met in his studies of incompatibles, he mentions the following:

Nitric Acid
Chloroform } .... of each 5 Gms.
Creosote

If this mixture is prepared by directly bringing the three products together, the disengagement of heat, caused by the reaction of the nitric acid on the creosote, suffices to volatilize the chloroform and to break the container, if this be a stoppered bottle. The nitric acid should first be added to the creosote, and the chloroform be introduced into the vial when the mixture has sufficiently cooled. Sulphuric acid is sometimes prescribed in veterinary practice with turpentine oil and a fatty oil. To prevent any accident in dispensing, the acid should be mixed with the fatty oil, and set aside until the reaction is over, when the turpentine oil is to be gradually added while shaking. The author cites a veterinary prescription containing: Sulphuric acid, tar, and potassium bichromate. The mixing of these substances must, of course, be done cautiously. Pulverize the bichromate, and triturate with it the tar; then gradually add the sulphuric acid, agitating continually with a glass spatula, the entire operation being done in a well-ventilated place. Let it stand till all reaction is terminated.

Dangerous Incompatibles.—Beri and C. Montroud state that by mixing barium hypophosphite and potassium chlorate, dried and pulverized separately, an exceedingly combustible substance is obtained. Ignited in the open air a dull explosion takes place, but the slightest obstacle to the free escape of the gases renders the explosion terrifically violent, analogous to that of fulminate of mercury. This powder is exploded by any gentle shock, the striking of the pestle against the side of the mortar, for instance. A mixture of syrupy sodium hypophosphite with sodium chlorate in powder, forms an explosive as violent as nitro-glycerin. Heated on a leaf of platinum this mixture first liquefies, then dries, and suddenly explodes, blowing a hole through the platinum foil—Drug. Circ., 1893, 203.

Uva Ursi and Spts. Nitrous Ether.—Report of explosion by John Calvert in Pac. Drug., 1893, 26.

Potassium Chlorate and Alcohol.—Schneider (Pharm. Central., 1893) says that alcohol and potassium chlorate should be mixed with caution; that if a few crystals of potassium chlorate, moistened with alcohol, be rubbed in a mortar, a number of little explosions will follow, making a noise like the crack of a whip. If a crystal of the chlorate be wet with alcohol, placed on an anvil, and struck a sharp blow with a hammer, a violent detonation will take place.

Potassium Chlorate Tablets.—A singular accident is described by a writer in the *Scalpel*, a French medical journal, as follows: "We were traveling, not long ago, in company with a gentleman who chanced to have in his coat-pocket a few compressed tablets of potassium chlorate, together with a penknife. The weather was intensely hot. In alighting, our friend struck against the carriage door with considerable force. The tablets, to his great amazement, instantly burst into a flame, which burned his hand quite severely before it could be extinguished."—Drug. Circ., 1894, 34.

Separation of Iodine.—The following gargle was recently prescribed (Jour. de Pharm., d'Anvers, June, 1893, p. 212): Iodine, 25 cgm.; potassium iodide, 1 gm.; tannin, 2 gm.: potassium bromide, 10 gm.; distilled water 50 gm.; glycerin, 50 gm.; oil of peppermint, 20 drops. In dispensing this, if the four solid substances are pulverized and mixed, then dissolved in the glycerin and water, a product is obtained in which the iodine has completely separated. This inconvenience can be avoided by mixing intimately the iodine, the iodide and the tannin, dissolving the mixture in the distilled water, which will require at least two hours, then adding successively the bromide, the glycerin and finally the oil of peppermint. By this procedure a perfectly limpid brown liquid is obtained.

Iron Salts and Pimento.—Wm. Duncan (Chem. and Drug., 1894, 210). The following mixture invariably deepens in color, finally becoming black :

Tinct. ferri. perchlor	ʒ ii.
Quin. sulph.	grs. xviii.
Sp. chloroformi	ʒ i.
Aq. pimentæ	ad ℥ vi.

On adding the iron to the pimento water the mixture assumes a greenish-blue tint, quickly deepening to yellowish-brown, and finally depositing a black insoluble precipitate. This result is a characteristic reaction of all phenols, and is due to the reaction between the ferric chloride and the eugenol of the oil of pimento.

Quinine Salts and Asaprol.—E. Ismail (Rép. de Pharm., 1893, 487). If into the solution of the asaprol a solution of basic or neutral quinine sulphate, or hydrochlorate, be dropped, a resinous body separates at the point of union, and adheres to the sides of the container. This material is insoluble in water, but dissolves readily in alcohol of 90°. If, on the contrary, the asaprol be dropped little by little into a test-tube, containing a solution of the quinine salts named, the immediate effect is a white turbidity, and after a short time a white precipitate is thrown down to the bottom of the tube, instead of swimming at the top, as in the former experiment. This precipitate soon becomes pasty and its color changes to gray.

Nitrate of Silver and Cocaine.—Wm. Duncan (Chem. and Drug., 1894, 210).

Argentic nitrate	grs. x.
Cocaine	grs. xii.
Water	to make ℥ i.

Sig. The lotion for the throat.

The prescriber is evidently alive to the incompatibility of the alkaloidal hydrochlorate with silver nitrate, and therefore orders the alkaloid. It is only sparingly soluble, but nevertheless sufficiently so to reduce the silver salt. If the alkaloid be carefully neutralized with nitric acid before adding the silver nitrate, a perfectly clear and stable solution results.

Citrine Ointment and Liniment of Lime.—W. F. Martin (Chem. and Drug., 1894, 210,) dispensed an ointment consisting of equal parts of citrine ointment and liniment of lime. In 24 hours the product was darkened. On investigation the blackening was found to be due to the precipitation of black mercurous oxide by the free calcium hydrate.

How to Label a Gargle.—Should it be marked for "external use?" The Rép. de Pharm., 1894 ; Chem. and Drug., 1894, 304, proposes the following course :

1. If the remedy contains dangerous substances, corrosive or poisonous,

the pharmacist should use a label for "external use," and even a mention "poison," as the case may be, and without regard to the dose.

2. If the gargle only contains such ingredients as may be swallowed without danger, even in strong doses, the pharmacist can dispense with any special label, and simply follow the doctor's instructions.

Lanoline Emulsion.—R. H. Jones, in Brit. and Col. Drug., 1894, 302.

Quin. hydrochlor.	gr. xl.
Spt. chlorof.,	
Glycerin,	
Lanolin	āā ℥ ss.
Aquam	ad. ℥ xii.

The best method with alkalies to obtain an emulsion was to stir into the lanoline in a hot mortar about its own weight of water, then to add the alkali (30 grs. K_2Co_3 or 60 mins. liq. potass. to the ℥ss. of lanoline) dissolved in a small quantity of water, and finally the rest of the water. Better than alkalies or soap the author found mucilage or yolk of egg as an emulsifier, using half an ounce of mucilage or one yolk of egg to the half-ounce of lanoline in the usual way. In the prescription above the quinine salt throws out the lanoline. If mucilage is used, care is to be taken lest the spirit spoil the emulsion. Yolk of egg is compatible with all, and makes the best emulsion if the yellow color is not an objection.

Check Prescription Label.—A. L. Lengfeld, of San Francisco, has adopted (Cal. Drug.) a method whereby each prescription dispensed in his pharmacy can be traced back to the dispenser, his plan being to print on the back of the label the following: "Dispensed by . . . . . . Checked by . . . . . . Date . . . . . ." This can be read when the label has been pasted on a bottle, or if on an ointment jar, it can first be soaked off and then examined. This arrangement is a check upon carelessness on the part of the pharmacist. The additional check of having a second person to revise the work reduces the chances of error to a minimum.—West. Drug., 1894, 57.

Altered Copies.—F. Lascar cites a number of cases of prescriptions wilfully altered by the pharmacist.—Amer. Drug. and Pharm. Rec., 1894, 239.

How to Keep Prescriptions.—A. E. Derter.—Amer. Drug. and Pharm. Record., 1893, 102. F. Edel in Merck's Mark. Rep., 1893, 233.

Ownership of the Prescription.—Discussion of this subject in Medical Record. Reprinted in Amer. Drug. and Pharm. Rec., 1894, 226.

Hieroglyphic Prescriptions.—Drug. Circ., 1893 and 1894.

——— Montreal Pharm. Jour., 1893, 155.

——— Pacific Drug., 1894, 8, 19.

——— Meyer Bros. Drug., 1893, 164; 1894, 117.

Assay of Drugs.

Assay of Alkaloidal Drugs.—Alkaloidal assaying has received a valuable contribution in the work of C. C. Keller, which appeared in a publication commemorating the fiftieth anniversary of the organization of the Swiss Apothecaries' Association. *Nux Vomica.*—15 Gm. of the dried and finely powdered seeds are placed in a small extraction tube (12 Cm. long, 25 Mm. wide, terminating in a delivery tube 7 Mm. wide and 5–6 Cm. long, the end of which is ground obliquely; the upper end of the extraction tube is ground so that it can be covered with a small glass plate), uniformly packed and percolated with ether (this is facilitated by connecting the apparatus with an air-pump until the ether reaches the small plug of cotton), allowing the percolate to drop into a vial of 150 Gm. capacity until 10 drops of the percolate leave no residue upon evaporation, which requires about 100 C.c. ether and from 30 to 90 minutes, according to the fineness of the powder. (To determine the amount of alkaloid extracted in this treatment by the solubility of the alkaloidal salt in the fixed oil solution, the ethereal solution was agitated with an excess of $\frac{n}{10}$ hydrochloric acid, the greater part of the ether decanted and the residual liquid titrated with $\frac{n}{10}$ ammonia, using iodo-eosin as indicator (Am. Jour. Pharm., 1892, 521.) The rather remarkable observation was made in this connection that using the unpeeled nux vomica about 24 per cent. of the total alkaloid was found in the yellow ethereal solution, against only 7 per cent. in the case of peeled nux vomica, yielding a colorless filtrate; the fat averaging 3.15 per cent. The extraction tube is next placed in a dry, tared vial of 250 Gm. capacity, the cotton plug pushed into the vial and the drug washed in with ether, adding of the latter to make up to 100 Gm.; after adding 50 Gm. chloroform and thoroughly agitating, 10 C.c. ammonia water (10 per cent.) are added and the mixture shaken repeatedly during half an hour. In the meantime the ethereal fat solution is agitated with 5 C.c. $\frac{n}{10}$ hydrochloric acid and 10 C.c. water, pouring off the ether as far as practicable and securing a complete separation by the use of a separating funnel, which is then washed with several portions of water so that the acid solution and washings measure 25 C.c. This acid liquid is added to the mixture in the vial, shaking for several minutes, and after the separation into two layers 100 Gm. of the ether-chloroform solution are poured (if necessary through a small filter moistened with the solvent) into a tared Erlenmeyer flask and the solvent distilled off. The alkaloids remain as a colorless varnish which is freed with difficulty from the chloroform by heat, but which can be easily effected by covering the alkaloids several times with small quantities of alcohol which is then boiled away in a water-bath; the alkaloids during these operations become crystalline and can be dried to constant weight at a temperature *not exceeding* 95–100° C. The alkaloids can then be titrated by dissolving in 5 C.c. chloroform with the aid of a little heat, adding 40 C.c. ether, 10 C.c. water, one drop of an alcoholic iodo-eosin solution (one per cent.) and 10 C.c. $\frac{n}{10}$ hydrochloric acid; after agitation the excess of acid is titrated with $\frac{n}{10}$ ammonia until a permanent red color appears in the aqueous solution; after each addition of ammonia the flask must be corked and agitated; 1 C.c. $\frac{n}{10}$ acid is taken as the equivalent of 0.0364 Gm. alkaloid. The following table exhibits the results:

	ALKALOIDS.		
	By Weighing. Per Cent.	By Titrating. Per Cent.	Difference. Per Cent.
(1) Unpeeled	2.640	2.548	0.092 = 3.50
(2) Unpeeled	2.685	2.611	0.074 = 2.01
(3) Peeled	2.855	2.795	0.060 = 2.10
(4) Peeled	2.780	2.725	0.055 = 2.18

The difference between weighing and titrating is so slight that the former suffices for practical pharmaceutical purposes, and enables the assay to be completed in less than three hours. It is important to adhere to the use of two parts ether and one part chloroform in the extraction, since a larger proportion of chloroform increases the yield of crude alkaloids (probably caused by solution of the glucoside loganin; the red color obtained by warming the crude alkaloid with dilute sulphuric acid indicates this), and hence, a greater difference is shown between the weighed and titrated alkaloids. The use of a greater proportion of ether risks loss of alkaloids by crystallization, since the alkaloids are almost insoluble in pure ether. The fear that the peeled nux vomica contains a considerably higher percentage of alkaloids than the unpeeled appears groundless from the results of the analyses quoted; for pharmaceutical purposes the peeled nux vomica is preferable because of its advantages in making tincture and extract.

Strychnos bark is assayed as the seeds, with the difference that the bark is first percolated with a mixture of ether and chloroform; these solvents extract only traces of alkaloid, but leave a dark greenish brown residue of chlorophyll, fat, wax, etc., amounting to 0.93 per cent. of the bark. The yield of alkaloids is higher than in the seeds, three determinations giving 4.55–4.56 per cent.; the alkaloids were obtained as a yellowish varnish which required treatment with four portions of alcohol before a crystalline appearance was noted; the residue was obtained of constant weight after considerable difficulty due to the preponderance of brucine; by a method to be described there was found in the alkaloidal residue, strychnine 33.6 per cent., brucine 66.4 per cent.

The dry alcoholic extract of nux vomica was assayed by placing 1.5 Gm. of the dry, finely powdered extract in a vial of 150 Gm. capacity containing 10 Gm. water, agitating until a uniform mixture is obtained, adding

30 Gm. chloroform and 60 Gm. ether, and, after agitating, 5 C.c. ammonia water (10 per cent.). The mixture is agitated for several minutes, and the vial set aside; after 15–30 minutes the mixture will separate so that 60 Gm. of the chloroform-ether solution can be transferred to an Erlenmeyer flask, filtering if necessary, and the assay finished as already described. An extract made by himself from the unpeeled seeds (which had previously been extracted with ether), and 70 per cent. alcohol yielded 12 per cent. extract containing 21.2 per cent. alkaloids; two commercial extracts yielded 14.3 and 16.2 per cent. alkaloids.

The quantitative separation of strychnine and brucine is effected by a modification of Gerock's method, and is dependent upon the alteration of brucine sulphate by dilute nitric acid into compounds having no basic character, while strychnine sulphate suffers very little or no decomposition under the same circumstances. 0.2–0.4 gm. of the purified alkaloids (the crude alkaloids are dissolved in dilute sulphuric or hydrochloric acid with the aid of heat, the solution filtered and extracted with a mixture of 3 parts chloroform and 2 parts ether after adding ammonia in excess; the chloroform-ether solution leaves the alkaloids colorless and perfectly soluble in dilute acids; any loss occasioned in the purification is of no moment, since it is desired to establish only the relative quantity of the two alkaloids) are dissolved in an Erlenmeyer flask in 10 C.c. dilute sulphuric acid (10 per cent.), applying heat cautiously, so that as little evaporation as possible takes place; after cooling 1 C.c. concentrated nitric acid, sp. gr. 1.41–1.42, is mixed with the solution (very frequently the sulphuric acid solution upon cooling deposits crystals of strychnine sulphate, which dissolve again on the addition of the nitric acid), producing the well known red coloration of brucine with nitric acid; the flask is set aside for one or one and a half hours at the ordinary temperature, adding at the expiration of the time 40 gm. chloroform and 40 gm. ether, and, after agitation, 10 C.c. ammonia water (10 per cent.); the mixture is shaken for several minutes, and 40 gm. of the chloroform-ether solution filtered into a tared flask, the solvent distilled off, and the residue (strychnine) dried at 95–100° C. and weighed. The crystallization of the strychnine is so sudden that the crystals are thrown around in the flask with considerable violence; to obviate this the distillation should be discontinued as soon as crystallization commences, and the remainder of the solvent gotten rid of by an air-current, which also facilitates the final drying. The strychnine is generally of a yellowish color, due to traces of adhering coloring matter; it must always be tested for brucine by solution in concentrated sulphuric acid and addition of a small crystal of potassium nitrate, only a pale yellow color being allowable. This method is also satisfactory in testing commercial brucine for strychnine. Six determinations of the strychnine in the alkaloids from nux vomica gave results varying from 45.1–50.6 per cent., and averaging 47.16 per cent., confirming the statement of Beckurts that the two alkaloids are present in about equal parts.

Cinchona bark assays are made by a very much simplied Haubensack-Kuersteiner method (Am. Journ. Pharm., 1891, 347; 1893, 71). 12 Gm. of the dried and finely powdered bark are placed in a vial of 250 Gm. capacity, 120 Gm. ether and after agitation 10 C.c. ammonia (10 per cent.) added, and the mixture repeatedly shaken during half an hour; if the bark to be assayed is succirubra 10 C.c., if calisaya, 15 C.c. water are added and the mixture agitated for one minute; 100 Gm. of the ethereal solution (which from succirubra is perfectly clear, from calisaya, however, is somewhat turbid) briskly agitated in a flask with 3 C.c. dilute sulphuric acid and 37 C.c. water, and allowed to stand for about ten minutes, when a perfect separation will allow of the decanting of the greater portion of the ethereal layer, the remainder is transferred along with the acid solution to a small separator and the acid solution allowed to run off into a beaker and the flask and separator rinsed with 10 C.c. water; the acid solution is freed from ether by warming and replaced in the cleansed separator, where it is agitated with a mixture of 30 Gm. chloroform and 10 Gm. ether along with 5 C.c. ammonia water. The chloroform-ether solution is run into a flask and the agitation repeated with 15 Gm. chloroform and 5 Gm. ether; the united alkaloidal solutions are filtered through a small chloroform-wetted filter into a tared flask and the solvents distilled off. The alkaloids from calisaya are generally crystalline, from succirubra amorphous and retaining chloroform; by the addition of 3 to 5 C.c. absolute alcohol and boiling this away in a water-bath, the alkaloids are obtained crystalline andcapable of being easily dried at 100° C.; a higher temperature is to be avoided. The weighed alkaloids may be titrated by dissolving in 10 to 15 Gm. alcohol, adding water until precipitation commences, and titrating with $\frac{n}{10}$ hydrochloric acid, using hæmatoxylin as indicator (1 Gm. hæmatoxylin dissolved in 100 Gm. diluted alcohol with 2 to 3 drops of ammonia). From the results of a large number of assays 1 C.c. $\frac{n}{10}$ hydrochloric acid is the equivalent of 0.0315 Gm. calisaya alkaloids and of 0.0304 Gm. succirubra alkaloids.

Fluid extract of cinchona is assayed by diluting 6 Gm. fluid extract with 15 Gm. water, adding 90 Gm. ether and 5 Gm. ammonia water, and agitating repeatedly during one-half hour; from 75 Gm. of the clear ethereal solution, representing 5 Gm. of the fluid extract, the ether is distilled off and the alkaloids weighed at 95 to 100° C. The alkaloids must be titrated by dissolving in 10 Gm. alcohol, adding 40 Gm. water, two drops hæmatoxylin solution and sufficient $\frac{n}{10}$ hydrochloric acid to produce a permanent yellow coloration.

In assaying *extract of cinchona* 1.5 Gm. are triturated with 15 Gm. water, transferred to a vial of 150 C.c. capacity, 90 Gm. ether and 5 C.c. ammonia water added, thoroughly agitated during one-half hour, and 60

Gm. of the clear ethereal solution, representing one gram extract, proceeded with as above.

The thalleioquin test can be made with these several titrated solutions by diluting 1 C.c. with 9 C.c. water, adding 2 to 3 drops bromine water and, lastly, 1 C.c. ammonia water.—Zeitschr. Oest. Apoth. Ver., 1893, 563 and 586. Abstracted by F. X. Moerck in Amer. Jour. Pharm., 1894, 42.

Notes on Alkaloidal Assays of Drugs.—K. Schwickerath (Pharm. Rund., 1894, 36; Drug. Bull., 1894, 246) employs a mixture of petrolether (B. P. 50° C.) and chloroform (2 : 1) for absolute ether, and substitutes ether in "Prollius' mixture" by petrolether and chloroform. He also moistens the drug with water as Keller with good results.

The method of procedure in the examination of a drug would consequently be as follows:

First, the drug is to be moistened with a sufficient amount of water, whereupon a certain quantity of petrolether-chloroform and strong ammonia is to be added, and this mixture is to be shaken vigorously for several hours. The alkaloids are dissolved in the petrolether-chloroform; an aliquot portion of the solution, filtered through cotton, is placed in a shallow glass vessel containing 10 C.c. of dilute acid. Petrolether and chloroform are then evaporated at a low temperature, a current of air being passed over the solution during the process. Chlorophyll, resin, wax, etc., are deposited upon the surface of the acid-alkaloidal solution; the resinous and waxy particles adhering to the glass are to be thoroughly worked out with the dilute acid by means of a little platinum spatula or glass rod, whereupon the solution is filtered through paper either into the *perforator* or into a *separator-funnel.* The filter, as well as the glass vessel, is to be washed by small successive quantities of water, used to extract the resinous matter. The acid-alkaloid solution thus obtained is of such purity that in most cases washing of this solution with petrolether is unnecessary, and the alkaloid may be extracted with petrolether chloroform directly.

With some alkaloids, such as the cinchona alkaloids, hydrastine, etc., it may happen that towards the end of the extraction, if the alkaloidal solution is too concentrated, the alkaloids will crystallize out, which renders their extraction considerably more difficult. In this case muriatic acid should be added through the little funnel until the liquid is decidedly acid, the solution being stirred up with the stem of the funnel, and after the alkaloids are again dissolved they should be re-precipitated with alkali.

In the examination of conium the author adopted a proposal of Liljenstroem (Pharm. Zeit., 1894, 56), placing in the little flask 10 C.c. $\frac{n}{20}$ sulphuric acid at the beginning of the extraction. The author thinks that benzin answers better for the extraction of coniine than does sulphuric ether. In the drug, as well as in the extract of conium, it is very probable that ammonium compounds are present; the caustic soda or sodium carbonate added for the separation of coniine would not only set free the coniine, but also ammonia, which would be carried over into the flask by the ether saturated with water, and so cause a higher result. In the use of benzin this defect is largely removed.

The author has appended extensive tables upon the assay of some drugs. The methods given for the drugs are also applicable to the examination of *fluid* and *solid extracts*. In place of the given weight of drug, the corresponding volume in cubic centimeters of fluid extract and about the fifth part in weight of solid extract are to be taken. The latter is to be dissolved in dilute alcohol and then evaporated—as with the fluid extract—on the least possible amount of cleansed sawdust, at a moderate temperature. The dry mixture thus obtained is then to be moistened with a sufficient quantity of water and treated in the same way as the corresponding drug.

Assay of Alkaloids in Vegetables.—Grandval and Lajoux (Jour. Pharm. Chim., 1893, 99, 152) state that, by a slight modification, this process is applicable to the determination of all alkaloids in vegetables. As examples see Ipecac and Coca.

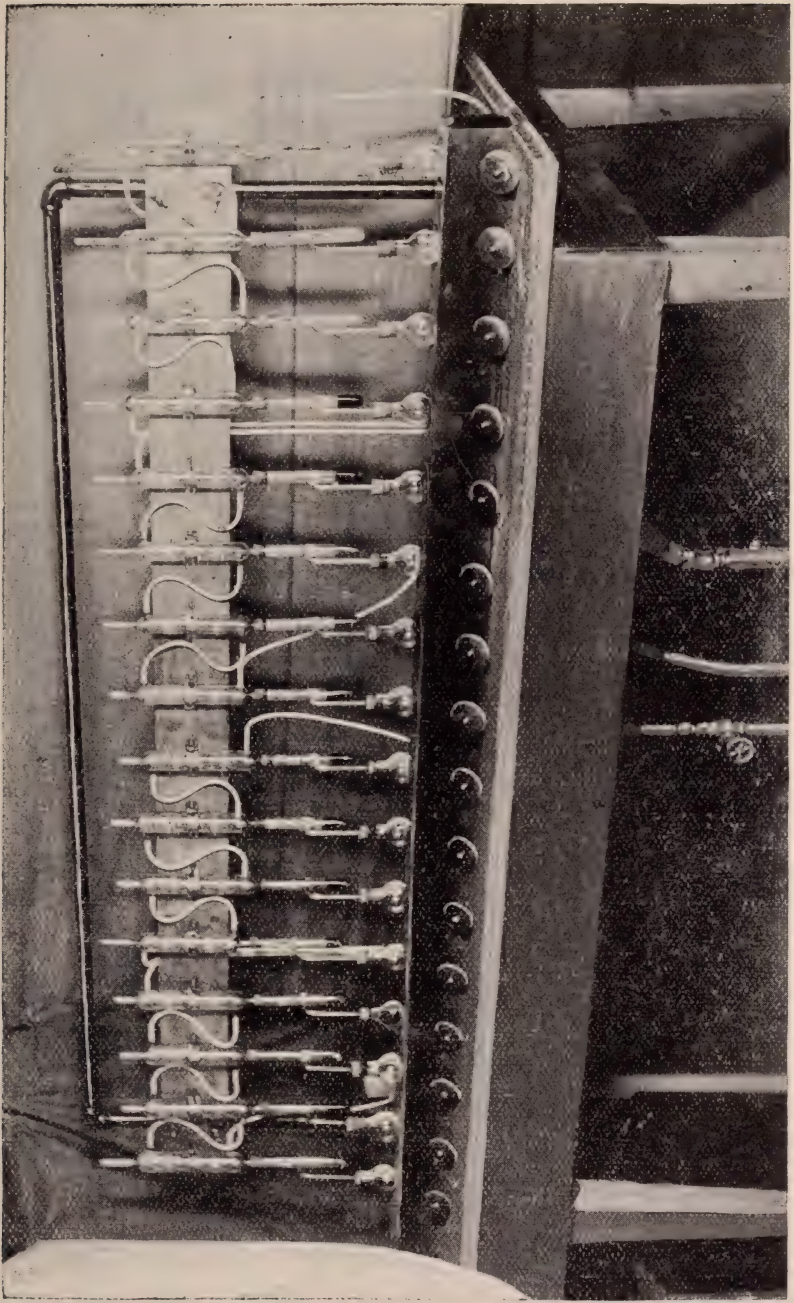
Pharmaceutical Assaying.—C. E. Sonnenburg has employed some five different methods of assay, and while his paper is intended to make the subject more acceptable to the pharmacists generally, he appends the results of the assays of 10 Fld. Exts. (Drug. Circ., 1893, 173):

Name of Fluid Extract.	Per cent. of alkaloids obtained by assay No. 1.	Per cent. of alkaloids obtained by assay No. 2.	Per cent. of alkaloids obtained by assay No. 3.	Per cent. of alkaloids obtained by assay No. 4.	Per cent. of alkaloids. obtained by assay No. 5.
Belladonna (Eng. leaves)	0.360	0.371	0.363	0.290	0.340
Hyoscyamus (Eng. leaves)	0.128	0.1366	0.099	0.114	0.108
Nux vomica	0.610	0.510	0.668	0.790	0.803
Colchicum (seed)	....	0.276	0.298	0.308	....
Coca leaves	0.291	0.350	....	....	0.348
Ignatia (2 years old)	1.040	0.970	0.810	....	0.960
Cinchona (yellow)	4.000	4.890	3.601	5.000	5.000
Digitalis	0.908	0.807	....	0.891	....
Ipecacuanha	0.860	0.710	0.821	....	0.698
Opium	15.101	15.670	14.890	....	....

Extraction Battery for Alkaloidal Assaying.—J. M. Francis describes a battery of extractors.

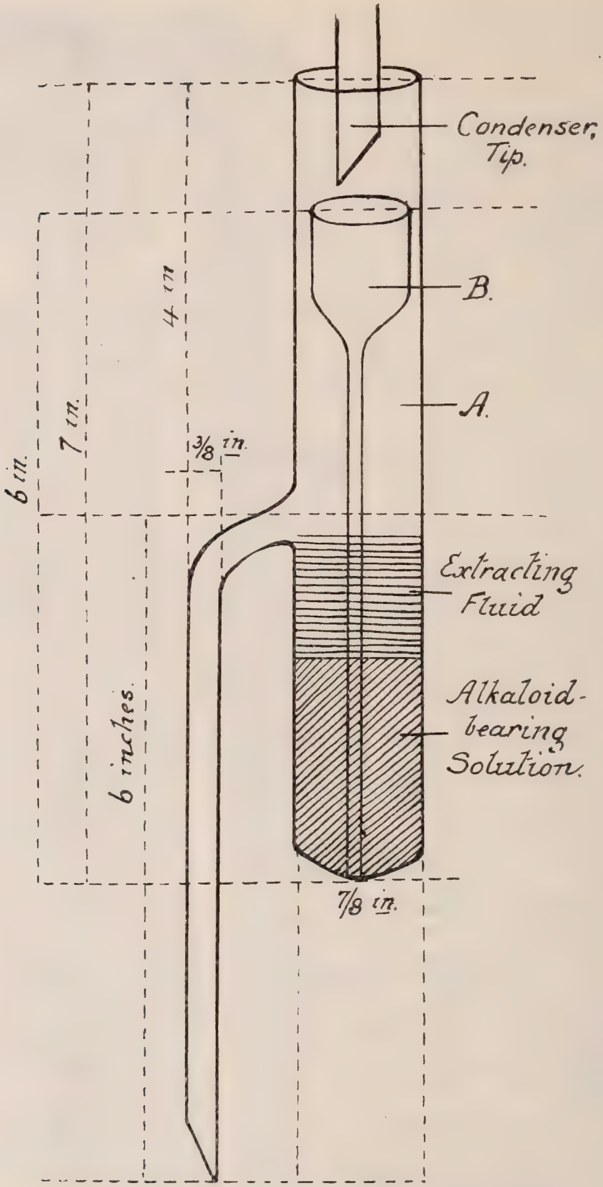
This battery consists of a frame of ¾-inch piping 32 inches high and 7 feet long, supporting a grooved plank 6 inches wide, 8 feet long and ¾-inch thick, to which are strapped by inch copper bands (controlled by thumb screws) sixteen condensers. For attachment to these condensers there

FIG. 33.



Extraction Battery for Alkaloidal Assaying.

FIG. 34.



Extractor for Alkaloidal Assaying.

are sixteen extractors ("perforators"—see Fig. 34). The receptacles for the extractive fluid—ether, chloroform, etc.—are 4-oz. wide-mouth flasks; these are accurately fitted by corks to the arms of the extractors, and rest upon openings in the top of a copper steam-bath.

The steam-bath is 8 feet long, 5 inches deep, and 4½ inches wide; the openings in this bath are sixteen in number, diameter 1¾ inches, and closed when not in use by ground brass caps. Heat is furnished by two brass pipes ¾ inch in diameter.

The extractors noted are made according to the design of Bosman's modification of the apparatus of Van Ledden Hulsebosch.—Pharm. Centralh., 1893, 101; Pharm. Rund., 1893, 83, 186; Bull. Pharm., 1894, 55; Amer. Drug. and Pharm. Rec., 1894, 273.

Determination of Alkaloids in Preparations Containing Aconite, Belladonna, Hyoscyamus, Stramonium and Conium.—Ramsey has examined extracts, tinctures, oils, ointments and plasters. The methods and results are given of analyses.—Jour. Pharm. Chim., 1893, 208, 264.

Assay Methods for Drugs and Galenical Preparations.—K. Schwickerath (Pharm. Rund., 1893, 282; Bull. Pharm., 1893, 534) considers the Van Ledden Hulsebosch method as best suited for making a large number of alkaloidal determinations. He does not employ the Smetham apparatus recommended by Van Ledden Hulsebosch, but prefers one made in accordance with a suggestion of Bosman. For details of description the reader is referred to an article with cut, in the Rundschau, 1893, p. 186. This apparatus possesses several advantages over that of Smetham: First, it is cheaper; a chemist at all familiar with the glass-blower's art can readily make one himself. Secondly, we are here enabled to introduce a small strip of litmus paper into the extract solution for the detection of the reaction. Thirdly, at the close of extraction, the layer of ether over the extracted solution can be transferred to the flask by carefully inclining the apparatus. And lastly, the apparatus is more readily cleaned and, perhaps, less fragile. It works admirably.

Extract of Aconite.—F. Casson examined six samples by the following process: 10 Gm. of the extract was dissolved in water, 5 C.c. acetic acid, and 25 C.c. of lead acetate solution, 1 in 4, added. The filtrate was measured, the lead precipitated by means of sodium phosphate, and the liquor again filtered. A quantity of the filtrate equal to 5 Gm. of the extract was shaken once or twice with ether while acid, the ether separated, the liquid rendered alkaline, and the alkaloid shaken out by ether in the usual way. The ether was evaporated and the alkaloid weighed. The results obtained were as follows:

No.	Color.	Consistence.	Moisture.	Ash.	Ether-sol. Alkaloids.
1	Greenish-brown.	Fairly soft.	24.6	15.0	.27
2	" "	Very soft.	28.8	16.0	.20
3	Brownish-green.	Fairly soft.	19.8	19.4	.16
4	Brown.	Hard.	21.6	18.09	.28
5	Greenish-brown.	Very soft.	28.7	14.6	.20
6	" "	Fairly soft.	27.18	15.5	.17

Now the yield of extract from the fresh herb is about 7 per cent., and taking Squire's figures of 3 per cent. of alkaloids in the dry leaf as being .056 on the fresh, we should expect a well-prepared green extract to contain .8 per cent. of alkaloid; whereas the average of the above table is .213 per cent. There is, then, obviously a considerable loss of alkaloid during the manufacturing process. A considerable variation is also to be noticed in the alkaloidal content of the different samples—a variation having a most important effect on the value of the extract as a therapeutic agent.

Thus, the maximum dose of the extract is one grain, containing, according to an average of the above figures, .0021 grain of ether-soluble alkaloids. But the dose of the tincture, which may be regarded as containing .05 per cent. of alkaloids, is 15 minims, or .008 grain alkaloid. Hence a maximum dose of the tincture is more than three times more active than a maximum dose of the extract.

It being impossible to subject a green extract to any accurate process of standardization, it would seem expedient for the use of this extract to be discontinued, and for it to be substituted by some more reliable preparation.—Phar. Jour. Trans., 1893, 901.

Aconite Root.—C. C. Keller has recently reported upon five samples of commercial aconite-root which he had examined for alkaloid. The percentages of alkaloid he puts down at 0.87, 1.14, 1.05, 1.23 and 0.97; those that contained least alkaloid yielded a larger proportion of sugar. We do not gather from the author's remarks (Schweiz. Woch. f. Ch. und Phar.) that the percentages are for pure aconitine.—Chem. and Drug., 1894, 858.

Assay of Belladonna Leaves and Root—Also Hyoscyamus Leaves, Stramonium Leaves and Seed.—1. *Assay of the Drugs.*—Twenty Gm. powdered drug (40 Gm. hyoscyamus leaves) are digested with 150 C.c. of a weak Prollius mixture (with stramonium seed only 100 C.c. are requisite, whereas with henbane leaves 200 C.c. are to be taken) for twelve hours, shaking frequently. For the latter purpose, the most serviceable thing is an "agitator" run by water. Then permit to deposit and filter off through cotton 75 C.c. (with stramonium seed 50 C.c., with hyoscyamus leaves 100 C.c.) of the clear ethereal liquid corresponding to 10 and 20 Gm. of drug.

This is placed in a shallow glass vessel; add 8 C.c. of water, 2 to 3 C.c. of dil. sulphuric acid (2.5 per cent.), and set aside in a moderately warm place, permitting the alcohol and ether to evaporate. The chlorophyll, fat, wax, etc., are hereupon deposited in small adhering particles or in the form of a thin covering. The solution is filtered into the perforator, washing the vessel and filter with a little water and adding ether. The acid solution is washed with ether for about an hour; then, after adding 4 to 5 C.c. of dilute ammonia water (5 per cent.), extract three hours with ether. Evaporate solution to dryness, avoiding unnecessary heat as much as possible. Dissolve the alkaloids in 10 C.c. $\frac{n}{20}$ H_2SO_4, and titrate the excess of acid with $\frac{n}{100}$ caustic soda, the indicator being cochineal. 1 C.c. of $\frac{n}{100}$ H_2SO_4 = 0.00289 Gm. of mydriatic alkaloid. A table of results is appended of assays of the leaves of belladonna, stramonium and hyoscyamus, belladonna root and stramonium seed. In assay of *Solid Extracts*, a process applicable only to extract of belladonna leaves and root is as follows: *Process 1:* Take 2 to 3 Gm. of extract, and work this up *thoroughly* with 8 C.c. of dil. sulphuric acid (2.5 per cent.), using a small spatula for the purpose. A platinum wire will answer admirably if about two millimeters thick and beaten flat at both ends. The acid aqueous solution is then filtered into the apparatus, the separated chlorophyll, etc., remaining on the filter. Beaker glass and filter are rinsed with a little water; wash the acid solution for one to two hours with water; then add 4 to 5 C.c. of dil. ammonia water (5 per cent.), and extract for three hours. Proceed further in the manner prescribed for the drug. The alkaloids thus obtained are still slightly colored, but the coloration is so faint that it nowise affects the titration. If an almost colorless alkaloidal solution be desired, proceed as follows:

Process 2: Dissolve 3 to 4 Gm. of extract (with henbane take 6 to 8 Gm.) in a little dil. alcohol (75 per cent.). Add this solution in several portions to a corresponding quantity of oak-wood sawdust, and evaporate the alcohol under gentle heat. Then digest the dry mixture several hours, shaking frequently (it is best to use the agitating apparatus), with 150 or 200 C.c. of diluted Prollius mixture, according to the quantity of sawdust employed. Now filter off 100 C.c., etc.

A. *Assay of Extracts.—Process 1* (Applicable only to extract of belladonna leaves and root): Weigh 2 to 3 Gms. extract, work up with 8 C.c. dil. H_2SO_4 (2.5 per cent.). The aqueous solution is filtered, the separated chlorophyll remaining in the filter. Wash the acid solution for 1 to 2 hours with water; add 4 to 5 C.c. ammonia water (5 per cent.), and extract for 3 hours. Proceed further in the manner prescribed for the drug.

Process 1 yields an almost colorless alkaloid. Dissolve 3 to 4 Gms. extract (with hyoscyamus take 6 to 8 Gms.) in a little dil. alcohol (75 per cent.). Add this in several portions to a corresponding quantity of oak-wood sawdust (Pharm. Rund., 1892, 239), and evaporate the alcohol under gentle heat. Digest the dry mixture several hours, shaking frequently with 150 to 200 C.c. of diluted Prollius mixture, according to the quantity of sawdust employed. Filter off 100 C.c. (corresponding to two-thirds and one-half respectively of the quantity of extract taken), unite this in a shallow glass vessel with 8 C.c. of water, 2 to 3 C.c. of dil. sulphuric acid (2.5 per cent.) and proceed in the manner previously stated.

Results of analysis are given in paper.

B. *Fluid Extracts.—Process 1* (not applicable to fluid extract stramonium seed and hyoscyamus leaves): 10 C.c. of the fluid extract are placed in a small beaker glass and warmed gently until the alcohol is evaporated. In this case, for dispelling the alcohol, the vacuum desiccator is used without application of heat, permitting the extract to remain in the desiccator over night. The residue obtained is treated in the manner indicated for the solid extract.

Process 2: 20 C.c. fluid extract (with hyoscyamus 40 C.c.) are added to a corresponding quantity of sawdust. Mixture dried and digested several hours with 100 and 200 C.c. respectively of Prollius mixture, shaking frequently; and then treated in the regular manner 50 and 100 C.c. respectively of the ethereal solution (corresponding to 10 and 20 C.c. respectively of the fluid extract). Value of drugs assayed given.—K. Schwickerath (Pharm. Rund., 1893, 282; Bull. Pharm., 1893, 534).

Cacao Alkaloids.—W. E. Kunze (Zeitschr. f. Anal. Chem., 1894, 1) employs the following method: 10 Gm. cacao are boiled for twenty minutes with 150 C.c. of 5 per cent. dilute sulphuric acid, the mixture filtered, the residue washed, the alkaloids precipitated from the filtrate and washings by the addition of phospho-molybdic acid, allowed to stand for twenty-four hours, the precipitate collected, washed with 800–1000 C.c. of dilute sulphuric acid; the filter with precipitate is placed in a beaker, covered with baryta water, carbon dioxide passed in to thoroughly precipitate the baryta, the mixture evaporated to dryness in a water-bath, the residue extracted with boiling chloroform and the solution evaporated, dried and weighed.

The alkaloids, almost pure white in color, are dissolved in ammonia and boiled almost to dryness with an excess of titrated silver nitrate solution of about 5 per cent. strength, the precipitate (a silver substitution compound of the formula $C_7H_7AgN_4O_2$) collected, washed and the excess of $AgNO_3$ estimated in the filtrate and washings with a standardized solution of potassium sulpho-cyanate; one molecule silver nitrate is the equivalent of one molecule theobromine, the quantity of total alkaloids less the ascertained quantity of theobromine equals the quantity of caffeine. Both alkaloids may be recovered and weighed as such; the filtrate and washings in which the excess of silver nitrate was determined are evaporated to dryness and the caffeine extracted with chloroform; the theobromine silver is dissolved in dilute nitric acid, the solution neutralized, evaporated to dryness and also extracted with chloroform.

Caffeïne—Estimation of.—A. Grandval and H. Lajoux. The finely-powdered material (5 Gm.) is stirred with a well-shaken mixture of ether (5 Gm.) and officinal (French) solution of ammonia (1 Gm.) in a porcelain capsule; the powder is then completely extracted with chloroform (50 C.c.) in a reflux extraction apparatus, the chloroform is driven off from the extract, and the residue, after being moistened with 10 per cent. sulphuric acid (1 C.c.), is extracted several times, to complete exhaustion, with small quantities of hot water, and the aqueous solution is filtered, the funnel being covered with a watch-glass. In the case of roasted coffee, the aqueous solution is made alkaline with soda, and completely extracted with chloroform, the chloroform extract is evaporated, and the residue of caffeïne is weighed. In other cases the solution is treated with excess of ammonia, evaporated, the residue completely extracted with chloroform, the chloroform extract filtered and evaporated, and the residue of caffeïne weighed. The process is accurate, and takes only three hours to perform. Black tea contains 2.9, raw coffee 0.988, roasted coffee 0.9, and kola nut 2.3 per cent. of caffeïne.—Jour. de Pharm. et de Chim., 1893, 545.

Rapid Estimation of Caffeïne in Tea and Coffee.—Guillot. 5 Gm. of finely-powdered tea is boiled for 20 minutes with 100 C.c. of water, water being added occasionally during the boiling, to restore the loss caused by evaporation. 5 Gm. of lime is then added, and after the boiling has been continued for another 15 minutes the mixture is filtered through a small wet cloth, and the insoluble matter again boiled with 50 C.c. of water, this operation being once more repeated. The united filtrates are now put into a 500 C.c. stoppered separatory funnel, and agitated three times in succession with 60 C.c. of chloroform. When clear, the chloroform is drawn off, filtered through cotton-wool, and evaporated in a tared dish.

The residual caffeïne is fairly pure. When applying the process to coffee, this must be coarsely ground, dried, and reduced to a fine powder. It is then boiled with water first for half an hour, then again twice for a quarter of an hour, and finally treated like the tea decoction.—Apoth. Zeit., 1893, 132.

Caffeïne in Tea.—Sokoloff estimates the amount of caffeïne (theine) in tea by moistening with 15–20 drops of alcoholic ammonia, and extracting in a Soxhlet apparatus with chloroform. Subsequently, the chloroform is distilled off, and magnesia added to the residue, which is then extracted three times with boiling water, filtered, and the filtrate evaporated to dryness. In this way the caffeïne is obtained almost pure.—Chem. and Drug., 1893, 210.

Cantharides Assay.—M. Portes, in regard to cantharides, showed that a proportion of 0.7 to 0.8 per cent. of cantharidin was a fair average of the drug as found in commerce. The Paris Pharm. Society agreed with his suggestion that this standard should be adopted in the Codex, at the same time also agreeing to some minor modifications in the opium-assay process.—Chem. Drug., 1893, 354.

Cevadilla.—Powdered Cevadilla seeds, 15 Gm.; ether, 150 Gm.; water of ammonia, 10 Gm.; water, 30 Gm.; 100 Gm. (10 Gm. drug) are decanted, agitated with dilute hydrochloric acid, etc., as above, using ether as the solvent of the alkaloids. The yield of crude alkaloids is 4.25–4.35 per cent., compared with 1.2 per cent. of other investigators. The crude alkaloid represents a mixture of veratrine and veratridine ($C_{32}H_{49}NO_9$, mol. weight 591), sabadilline ($C_{41}H_{66}N_2O_{13} = 764$), sabatrine ($C_{20}H_{45}NO_9 = 516$) and a few other alkaloids occurring only in minute quantity, which can easily be titrated. From experiments the purified alkaloid has an equivalent weight of 620–630, so that one C.c. $\frac{n}{10}$ hydrochloric acid represents 0.0625 alkaloid.—C. C. Keller (Schwz. Wochenschr. f. Chem. u. Pharm.) Apoth. Ztg., 1894, 52 and 133.

Cinchona—Assay of Drug.—Three Gm. of drug, finely powdered and dried, are macerated with 150 C.c. of a weak Prollius mixture for about twenty hours, shaking frequently (it is best to use an agitating apparatus). Then filter off through cotton 50 C.c., corresponding to 1 Gm. of drug, Place in a shallow glass vessel, add 10 C.c. dilute hydrochloric acid (1 : 10); and permit the alcohol and ether to evaporate at a moderate heat. The acid solution thus obtained is now filtered into the extractor, washed, extracted, etc., as in the manner prescribed for the fluid extract.

——— *Assay of Fld. Ext.*—To a graduated 50-C.c. flask containing 10 C.c. dilute hydrochloric acid (10 per cent.), add from a pipette 5 C.c. of the fluid extract (with cinchona comp. 10 C.c.). Shake, and make up to 50 C.c. with water. Allow the precipitate to settle, filter, and pour into the apparatus 10 C.c. of the filtrate. To confirm results as well as to save time, it is advisable to make duplicate extractions. Into a small flask put about 30 C.c. of petrolether, connect the flask with the apparatus, and wash for about one hour. By carefully inclining the apparatus, decant from the acid solution as much of the petrolether as possible. Now add to the acid extract solution, by means of a small funnel, 12 drops of a 30-per-cent. caustic soda solution diluted with 5 to 6 C.c. of water (or as much as will render the liquid decidedly alkaline); place a small ring of cotton around the funnel of the apparatus just below the mouth of the overflow-pipe. Then, in a clean tared flask place about 30 C.c. of the above-mentioned petrolether-chloroform mixture, connect the apparatus as before, and extract for three to four hours. Pour off the supernatant petrolether-chloroform into the flask, and evaporate the solution on a steam bath, preferably with the aid of an air-current.

The alkaloids thus obtained are perfectly white. Dry the alkaloids for a short time at 100° C., when they will become slightly yellow; finally determine the amount of alkaloids by weighing. The weight obtained multiplied by 100 (with cinchona comp. by 50) will give the percentage of total alkaloids in the fluid extract.

A number of comparisons by titration proved the alkaloids to be perfectly clean, for usually multiplying by the larger factor (324) rendered the results a little high, while the smaller factor (294) gave correspondingly low results.—K. Schwickerath.—Pharm. Rund., 1894, 57; Bull. Pharm., 1894, 56.

Cinchona Assay.—Wm. Duncan. In the determination of this galenical preparation the solvent is apt to form an emulsion with the alkaline liquor, and the two liquids separate slowly and imperfectly. This may be avoided to some extent if a rapid rotatory motion rather than violent agitation is adopted. Even in experienced hands, however, and particularly with some samples of extract, emulsification frequently takes place and causes delay. This undesirable condition may be greatly minimized by modifying the official process as follows:

Take 100 grains of the extract and dilute with distilled water to 1 fluid ounce. Filter off half a fluid ounce (equal to 50 grains) and transfer to a separator. Then proceed as the Pharmacopœia directs. Extract of cinchona being acid, there is no danger of alkaloid being precipitated with the resins and coloring matter. To avoid any such danger, however, the extract may be further acidulated by the addition of a few drops of dilute hydrochloric acid. By means of two separators the author showed the relative rapidity and completeness with which the solvent separated in the case of the filtered extract.—Pharm. Jour. Trans., 1894, 885.

——— Grandval and Lajoux. The preliminary moistening of the powder may be done with the given mixture of ether, alcohol and ammonia, but the exhaustion in the displacement apparatus must be made with chloroform, which dissolves all the alkaloids. The chloroformic liquid may be treated with the acidulated water exactly as described above when ether was the vehicle.

With cinchona it sometimes happens that when the chloroform is agitated with acidulated water an emulsion is formed, and in such cases it will be necessary to pour off the emulsionized liquid and heat it in a water-bath. The chloroform being set free destroys the emulsion. Pour the liquid on a moistened non-folded filter, and wash and treat the filtrate with caustic soda in the presence of chloroform.—Jour. Pharm. Chim., 1893, 99, 152.

——— The marked improvement, however, in the new U. S. P. edition is shown in the detailed assay process now given for determination of the serviceable alkaloids, by which the quality of bark brought into this market should be improved, for all have it in their power now to demand a rich bark if they will simply take a little trouble to determine exactly what they are buying.—Squibb's Ephem., Jan. 1894.

Coca Leaves.—Digest in the "agitator" for 12 hours, 12 Gms. coca leaves with 95 C.c. benzene, 1 C.c. ammonia (30 per cent.) and 4 C.c. alcohol. Settle and filter through cotton 50 C.c. (= 6 Gms. of drug); add 2 C.c. sulphuric acid (2.5 per cent.) and 8 C.c. of water; evaporate alcohol and benzene, and filter acid solution into the perforator. Wash for 1 hour with ether, and then after adding 4 to 5 C.c. of dil. ammonia extract 3 hours with ether. Evaporate ether and determine alkaloid with $\frac{n}{100}$ sulphuric acid (1 C.c. = 0.00303). For assaying extracts, see belladonna.—K. Schwickerath in Pharm. Rund., 1893, 282; Drug. Bull., 1893, 534.

——— Grandval and Lajoux (Jour. Pharm. Chim., 1893, 99, 152). To determine the amount of cocaine in the leaves of erythroxylon coca, proceed in the same manner (see Ipecac), using the same mixture of ether, alcohol and ammonia on the same quantity of pulverized leaves. The final evaporation of the etherial liquid, however, gives crystallized cocaine nucleated in an amorphous and colorless mass of ecgonine. To separate them treat the entire residue with 2 C.c. distilled water, and add, drop by drop, hydrobromic acid until the mixture is entirely neutral. Heat the liquid in a water-bath, and while heating add potassium bromide, little by little, to saturation. On cooling we obtain a crystalline mass of the double bromide of cocaine and potassium. Pour out into a funnel whose delivery-tube is plugged with absorbent cotton, stir with an agitator and pour over the crystals a cold saturated solution of potassium bromide, which takes up the ecgonine without sensibly affecting the cocaine bromide. As soon as the liquid begins to pass off without color, cease washing, and pour boiling water into the funnel to dissolve the remaining crystals. Catch the solution in a decanting-glass, let cool and add caustic soda and ether as before; decant the ethereal liquor and allow it to evaporate spontaneously. The residue will be pure colorless cocaine.

Colchicum Root and Seed.—K. Schwickerath, in Pharm. Rund., 1893, 282; Drug. Bull., 1893, 534. Twenty Gm. of drug rather finely powdered are consigned to the "agitator" for twelve hours with 120 C.c. of a chloroform-Prollius mixture of the following composition: 1 C.c. ammonia water (30 per cent.), 5 C.c. alcohol, 24 C.c. chloroform, 70 C.c. ether. Permit to deposit, filter off 50 C.c. (=10 Gm. of drug), add this to 8 C.c. of water, and pour in acetic acid until an acid reaction is obtained. Alcohol and ether are then evaporated under moderate heat; filter the acid solution through cotton into the perforator, and wash the solution for an hour with petroleum ether. Then remove the petroleum ether over the alkaloidal solution as completely as may be, by carefully inclining the apparatus; add carbonate of sodium until a pronounced alkaline reaction is obtained, and extract the alkaloids with a mixture of 25 parts of chloroform and 75 parts of ether. In employing this chloroform-ether mixture, however, it becomes necessary to place in the perforator, at the mouth of the tube, a small layer of clean cotton, in order to prevent the bubbles, which may ascend from the extract solution, from gaining access to the flask. After the evaporation of the ether and chloroform, and drying of the alkaloids at a temperature not exceeding 100° C., the latter are determined by weight.

In Assaying the Fluid Extract. (See Belladonna.)—Difference being that the washing is performed with petroleum ether, the alkaloids separated with carbonate of sodium, and extracted with chloroform-ether.

Conium Extract.—Owing to the volatility of its alkaloid, it presents difficulties not met with in the assay of other extracts: G. Liljenström, in taking up this subject, ascertained that no matter how long (from 2 to 6 hours) the continuous extraction with ether of a mixture containing known quantities of coniine was continued, the total quantity of alkaloid could never be obtained. The explanation given is that the alkaloid being volatile is carried along with the ether and travels continuously from the receiving flask to the percolator and back again; by placing in the receiving flask an excess of $\frac{n}{100}$ acid and then continuously extracting with ether; the entire amount of coniine taken for the experiment could be recovered by an extraction lasting only fifteen to thirty minutes; the excess of acid is afterwards titrated with $\frac{n}{100}$ alkali, and from the difference the amount of coniine is calculated. This method appears to be the only one yielding reliable results, since in the methods of extracting the alkaloid from alkaline solutions with solvents and evaporating the solvents, no matter how carefully the latter operation is conducted, some of the alkaloid is lost by evaporation.—Pharm. Ztg., 1894, 57.

Conium Fruit.—K. Schwickerath. 10 Gms. digested 12 hours with 100 C.c. dilute Prollius mixture, 50 C.c. are filtered off and added to 8 C.c. water and 2 to 3 C.c. sulphuric acid (2.5 per cent.). Evaporate alcohol and ether, filter into perforator and wash for an hour with ether. Na_2Co_3 is added till alkaline, then extract for 3 hours with ether. Add 10 C.c. $\frac{n}{20}$ H_2SO_4, permit ether to evaporate. Titrate excess of acid with $\frac{n}{100}$ NaOH. (1 C.c. $\frac{n}{100}$ acid = 0.00172 Gm. alkaloid).—Pharm. Record, 1893, 282; Drug. Bull., 1893, 534.

Gelsemium Root.—20 Gms. of drug are digested with 100 C.c. of dilute Prollius mixture during twelve hours; filter off 50 C.c. (= 10 grammes of drug); add 8 C.c. of water, 2 to 3 C.c. of dilute sulphuric acid (2.5 per cent.), and permit the alcohol and ether to evaporate under moderate temperature. The acid solution is filtered through cotton into the perforator, and here first washed for an hour with petroleum-ether on account of the solubility of the alkaloidal sulphate. After the layer of petroleum-ether resting upon the alkaloidal solution has been poured off as far as possible by careful inclination of the apparatus, add 5 C.c. of dilute ammonia water (5 per cent.), and extract the alkaloids for three hours with ether. After careful drying, the alkaloids are weighed. A slight admixture of gelsemic acid always imparts to the alkaloids thus obtained a slight fluorescence. The fld. ext. is similarly treated after dispelling the alcohol.—Ibid.

Hydrastis.—Hydrastine being the active constituent only this is considered in the assay, which is based upon the same principles as that of the assay of ipecac. (1) Powdered hydrastis, 12 Gm.; ether, 120 Gm.; water of ammonia, 10 Gm.; water, 15 Gm.; 100 Gm. (representing 10 Gm. root), are to be decanted, the solvent removed and the residue weighed. (2) Powdered hydrastis, 25 Gm.; ether, 125 Gm.; water of ammonia, 10 Gm.; water, 30 Gm.; 100 Gm. decanted (20 Gm. root), extracted with dilute hydrochloric acid, etc., as described under Method 2 for ipecac assay, the yield of crude alkaloids is 2.63–2.97 per cent. As hydrastine cannot be titrated, the crude alkaloid is dissolved by the aid of heat in 8 C.c. alcohol, 4 C.c. ether and then gradually 20 C.c. water added; after standing for 24 hours almost the entire quantity of hydrastine will have crystallized out, so that the crystals can be removed to a filter, washed with about 6 C.c. cold water, transferred back to the flask, dried and weighed. Berberine can be extracted from the drug, previously extracted with ether, by the use of alcohol and precipitating as nitrate or tri-iodide.—C. C. Keller-Schweiz, Wochenschr. f. Chem. u. Pharm.; Apoth. Zeit., 1894, 52, 133.

Hydrastine in Fluid Extract of Hydrastis—Determination of.—E. G. Eberhardt proposes the following: Into an Erlenmeyer flask of at least 4 ounces capacity is put 25 C.c. of the fluid extract. This is heated on the water-bath to a point considerably short of boiling. Ten cubic centimeters of ether are now slowly and carefully added, so as not to cause loss by violent ebullition, and lastly 25 C.c. of a 2 per cent. ammonia solution, or a mixture of 20 C.c. of water with 5 C.c. of ammonia. The contents of the flask are rotated briskly for a few seconds and the whole then set aside for 12 hours, frequently rotating during the first two or three hours. After 12 hours the liquid is poured off into a funnel, into the neck of which a small plug of cotton has been loosely inserted, and the whole dried and weighed. When the liquid has all passed through, the crystals remaining in the flask are carefully rinsed into the funnel and washed with distilled water, until the washings pass off free of color. The funnel and contents are now dried at a temperature not exceeding 100° C., cooled in a desiccator and weighed. Subtracting from this weight the weight of funnel and cotton gives the amount of alkaloid obtained.

An alternative process of assay, which, however, requires more attention, consists in rendering 25 C.c, of fluid extract alkaline with ammonia and rotating in a separator with three separate portions of ether of 15 C.c. each, extracting the alkaloid from the mixed ether washings by agitating them with three portions of 10 C.c. each of 2 per cent. sulphuric acid, and lastly with 5 C.c. of distilled water, adding to the combined washings 10 C.c. of alcohol, 3 C.c. of ether, and ammonia sufficient to render alkaline. After allowing to stand for six hours with frequent agitation, the crystals are collected, dried and weighed.

A small amount of alkaloid is retained by the mother-liquor, for which a correction perhaps ought to be made. The results obtained by both methods are as follows:

	Shaking out.		Precipitation.	
	Alkaloid from 25 C.c.	Per cent. of Alkaloid.	Alkaloid from 25 C.c.	Per cent. of Alkaloid.
Fluid Extract No. 22907 ..	.447	1.788	.458	1.83
	.455	1.82	.443	1.77
	....	....	.442	1.768
	....	....	.445	1.78
	....	....	.485	1.94
Fluid Extract No. 22911	....	....	.582	2.328

—Amer. Jour. Pharm., 1893, 374.

Hydrastis Rhizome.—Twenty Gms. of powdered drug are exhausted with alcohol (94 per cent.) through hot repercolation. After cooling, the alcoholic solution is brought up to 100 C.c. and filtered. Separation of the berberine is first effected, by mixing 25 C.c. of the filtrate with 2.5 C.c. of concentrated hydrochloric acid, 0.5 C.c. concentrated sulphuric acid, and 12.5 C.c. ether. Better and more uniform results are obtained when the separation is effected not only in a cool place, but also in ice. The separation ensues completely within a few hours. The filtrate of the hydrochlorate of berberine is mixed with concentrated ammonia-water (30 per cent.) *cautiously until a faintly acid reaction* ensues, then filtered off from the deposited ammonium salts with cotton, and the faintly acid hydrastine solution introduced in two or three portions into a corresponding quantity of sawdust. After drying the sawdust at moderate heat, it is digested for several hours in the agitator with 20 C.c. of dilute Prollius mixture; then filter off 100 C.c. (= 2.5 Gm.); add 8 C.c. of water and 2 to 3 C.c. of dilute sulphuric acid (2.5 per cent.), permitting ether and alcohol to evaporate. The acid alkaloidal solution is now filtered into the perforator, washed for an hour with ether, and after adding 5 C.c. dilute ammonia-water (5 per cent.) the hydrastine deposited—almost snowy white—is extracted for three hours with ether. The ethereal alkaloidal solution is evaporated to dryness, the alkaloid dissolved in 10 C.c. $\frac{n}{20}$-sulphuric acid, and the excess of acid titrated with sodium hydroxide (1 C.c. $\frac{n}{100}$ acid = 0.00383 Gm. alkaloid).

For Solid Extract.—10 Gm. are warmed for a short time with 94 per cent. alcohol in a reflux condenser; after cooling, the solution is filtered, brought up to 100 C.c., and 25 C.c. of this treated in the manner described above.

With fluid extract take 20 C.c., combining this with about 80 C.c. alcohol, warm gently, cool, bring up the whole quantity of liquid to 100 C.c., filter, and treat 25 C.c. of the filtrate in the same manner.—K. Schwickerath, in Pharm. Rund., 1893, 282; Drug. Bull., 1893, 534.

Hemlock Fruit—Alkaloidal Strength of.—E. H. Farr and R. Wright consider that the evidence afforded by the examination of authentic specimens of hemlock fruit warrants them in stating that if collection take place at the proper stage of development, and the fruit be carefully dried, it should yield about two per cent. of alkaloidal hydrochlorates. They suggest, therefore, that tne *tincture* of the fruit should be standardized to contain 0.20 per cent. of coniine or 0.25 per cent. of the hydrochlorate; the dose of the tincture then remaining the same as that of the one now official.—Pharm. Jour. Trans., 1893, 188.

Emetine and Ipecac.—Grandval and Lajoux (Jour. Pharm. Chim., 1893, 99, 152). Make a mixture consisting of 8 C.c. of ether of 66°, 3 C.c. of alcohol of 95%, and 2 C.c. of ammonia. Agitate thoroughly and pour it rapidly, and all at once, over 10 Gm. of the ipecac to be assayed, reduced to powder and placed in a porcelain capsule. Triturate the mixture and quickly introduce into a displacement apparatus, made of a glass test-tube drawn out at the bottom and broken off, so that it measures 2 Cm. (0.8 inch) in diameter at the top and some 17 Cm. (6.8 inch) in length. The aperature of the drawn-out portion must be guarded by a little tampon of absorbent cotton, and as soon as the mixture is properly packed, cover it with a similar tampon shoved down into the tube. Pour over the mixture (through the cotton) sulphuric ether from time to time as is necessary, until the ipecac is exhausted. This will require in the neighborhood of 100 C.c. of ether, and the exhaustion will take about three hours. To assure yourself that the powder is exhausted, from time to time let a few drops from the percolator fall into a watch-glass, evaporate, and add to the residue one drop of diluted sulphuric acid (1 : 20), and one drop of the solution of the double iodide of mercury and potassium. If the powder is exhausted there will be no precipitate of the iodomercurate of emetine.

After exhaustion, introduce the ethereal percolate into a decantation-glass and agitate with 2 C.c. of sulphuric acid dilute (1 : 10), and 3 C.c. of distilled water. Decant the acid liquor, which is loaded with emetine, and wash the etherial liquid several times, using 4 C.c. of distilled water each time, until the wash-water gives no precipitate with the iodomercuric reagent. Unite the wash liquids and the acid liquid first decanted, and treat with caustic soda, and again agitate with ether. Evaporation of the ether yields pure emetine, with a scarcely noticeable shade of yellow color. Ipecac of good quality should yield from 1.6 to 1.8 per cent. of emetine.

Ipecac Root; Quebracho Bark.—4 Gms. of drug (10 Gms. quebracho) are agitated with 100 C.c. of dilute Prollius mixture for 12 hours. 50 C.c. (= 2 Gms. and 5 Gms., respectively, of drug) are then filtered off, 8 C.c. water and 2 C.c. sulphuric acid (2.5 per cent.) added, and the alcohol with the ether dissipated by gently warming.

The acid alkaloidal solution is filtered through cotton into the perforator, washed a full hour with ether, and, after adding 5 C.c. of dil. ammonia water (5 per cent.), extracted for three hours with ether. The ethereal alkaloidal solution is dried. With quebracho the alkaloids are determined by weight, whereas with ipecac the emetine obtained is dissolved in 10 C.c. of $\frac{n}{20}$ sulphuric acid, titrating the excess of acid with $\frac{n}{100}$ caustic soda. One cubic centimeter $\frac{n}{100}$ acid was taken as the equivalent of 0.00254 gramme emetine.

Solid Extract Determination.—Of ipecac take 0.5 Gm. (quebracho, 1 Gm.) dissolve in 8 C.c. water, adding 2 C.c. sulphuric acid (2.5 per cent.); filter and proceed as above.

Fluid Extracts.—Take 2 C.c. of the ipecac product, 5 C.c. of quebracho, but first dispel the alcohol by gently warming the solution.—K. Schwickerath in Pharm. Rúnd., 1893, 282; Drug. Bull., 1893, 534.

Emetine Estimation in Ipecac.—C. C. Keller, in Schweiz. Wochenschr. f. Pharm., 1893, 473, has improved his method and offers it in two forms:

(1) 12 Gm. powdered ipecac are deprived of fat with ether and transferred to a tared vial of 200 C.c. capacity by the method described under the assay of nux vomica, the weight of the ether made up to 90 Gms. and 30 Gm. chloroform added; after 5 minutes 10 C.c. water of ammonia (10 per cent.) are added, the mixture thoroughly shaken during one-half hour, 10 C.c. water added and again agitated for two or three minutes; 100 Gm. of the clear liquid are decanted, the solvent distilled off, the residue taken up twice with small quantities of ether (to remove the last portions of chloroform), heated for 15 minutes in a water-bath at 100° C., weighed and titrated.

(2) 12 Gm. powdered ipecac are placed in a vial of 200 C.c. capacity, agitated frequently during 5 minutes with 90 Gm. ether and 30 Gm. chloroform; after adding 10 C.c. water of ammonia and allowing to stand for one-half hour, 10 C.c. water are added, and 100 Gm. of the clear solution transferred to a separating funnel where it is agitated with three portions of 25, 15 and 10 C.c. of one percent. hydrochloric acid; the acid solutions are next transferred to the separating funnel, made alkaline with ammonia and extracted with two portions of 50 Gm. each of a mixture of chloroform three parts and ether two parts; the alkaloid solutions are filtered through an ether-wetted filter into a tared flask, the solvent re-

covered (the last traces of chloroform removed as above) the residue dried, weighed and then titrated as in the original publication. The difference (0.006 Gm.–0.13 per cent.) between the weight of the alkaloid and the amount ascertained by the titration is much less than in the original method (0.055 Gm.–0.335 per cent.) To determine to what extent emetine is present in the woody portion of ipecac root, best grades of dry Rio and Carthagena root were selected and the bark and wood carefully separated and used for the assays. Rio: bark, 2.908 per cent.; wood, 0.533 per cent. Carthagena: bark, 2.92 per cent.; wood, 0.65 per cent. In the examination of the woody portion if the results are much higher than 0.5–0.6 per cent., it would indicate that the root had become wetted. These figures for the wood, while higher than those generally quoted, still warrant the requirement that in providing the root the woody tissue be removed as far as practicable.

Nux Vomica Assay.—Assay of Fluid Extract (K. Schwickerath).

Assay of the Fluid Extract.—Pour into a porcelain vessel 10 C.c. of the fluid extract, and allow the alcohol to evaporate at a moderate heat. To the residue add 10 C.c. dilute sulphuric acid (2.5 per cent.), filter into a graduated 50 C.c. flask, wash the filter and porcelain dish with distilled water, and make up to 50 C.c. Place in the apparatus 10 C.c. of the filtrate, and wash with petrolether for about one hour. Now add 5 C.c. dilute ammonia (5 per cent.), arrange a ring of cotton, and extract from two to three hours with petrolether-chloroform.

The alkaloids thus obtained are dissolved, after evaporation of the petrolether chloroform, in 10 C.c. $\frac{n}{20}$ sulphuric acid, and titrated with $\frac{n}{100}$ caustic soda, 1 C.c. $\frac{n}{100}$ sulphuric acid being equivalent to 0.00364 gramme of mixed alkaloids. The result, multiplied by 50, gives the percentage of the total alkaloids in the fluid extract.

Assay of the Drug.—Macerate in the agitator 4 Gms. of dried drug finely powdered or rasped, with 100 C.c. of the following mixture: 2 C.c. ammonia (30 per cent.), 8 C.c. alcohol, 20 C.c. chloroform, 70 C.c. ether. Filter off through cotton 50 C.c. (= 2 Gm. of drug) place the filtrate in a shallow glass vessel; add 2 to 3 C.c. of dilute sulphuric acid (2.5 per cent.) and 8 C.c. of water; evaporate alcohol, ether and chloroform, under moderate heat; filter the acid solution into the apparatus, and now proceed in the manner indicated for the fluid extract.—Bull. Pharm., 1894, 56; Pharm. Rund., 1894, 57.

——— G. C. Keller has experimented on the gravimetric and volumetric methods of assaying nux vomica, and his results do not show much difference (Apoth. Zeit., 1893, 745). He first freed the powdered seeds from oil by means of ether, then extracted the alkaloids with a mixture of ether 10, chloroform 5, and dilute ammonia (10 per cent.) 1. The alkaloidal residues before and after titration with decinormal hydrochloric acid worked out as follows:

	By Weight.	By Titration.	Difference.
	Per cent.	Per cent.	Per cent.
No. 1	2.64	2.548	0.092 = 3.5
" 2	2.685	2.611	0.074 = 2.01
" 3	2.855	2.795	0.060 = 2.1
" 4	2.78	2.722	0.055 = 2.18

Iodeosin was used as an indicator in the titration.

Extract of Nux Vomica Assay.—Virgil Coblentz (Pharm. Rundsch.) calls attention to the uncertainties and difficulties attending the assay of extracts. To 1 Gm. extract (dried at 100° C.), in a test tube graduated to 25 C.c., add about 20 C.c. of a mixture of alcohol 4 pts., and water 1 pt., warm slightly till dissolved, then add menstruum sufficient to bring it to 25 C.c. By means of a pipette or graduate measure off exactly 5 C.c. (0.2 Gm.), of the liquid, pour into the abstracting graduate, washing out the measuring vessel with 10 C.c. of chloroform; to this mixture of extract and chloroform, add 1 C.c. of solution chloride of iron and then excess of sodium bicarbonate, and abstract by means of the mechanical stirrer, using a drop of glucose solution if necessary; two more portions of chloroform are sufficient to exhaust all the alkaloids, the solutions are then evaporated, dried and weighed.* The balance of the solution may be employed if necessary for control assay.

The chloroformic residues of the alkaloids after evaporation, were again dissolved in one C.c. of alcohol and again evaporated; thus all of the chloroform may be removed.

Amorphous alkaloidal residues are often hygroscopic; in this case so much so, that during the weighing it increases constantly. It is best to employ a beaker-shaped glass vessel with ground glass cover, then after drying at 110° C. adjust the cover tightly and cool in desiccator.

The following is a list of tabulated results, the first two, *a* and *b*, being my own, and *c* and *d*, those of Mr. C. O. Wells:

	1. Beckurts'.		2. Dunstan's.		3. Lyon's.		4. Lloyd's.		
	Weight Proc.	Titer. Proc.	Weight Proc.	Titer. Proc.	Weight Proc.	Titer. Proc.	Weight Proc.	Titer. Proc.	Proc.
a.	12.10	9.11	11.40	8.93	10.80	9.15	9.38	9.26	9.18
b.	12.32		11.31		10.90		9.45	9.31	9.23
c.	11.98	9.18	12.15	9.01	10.98	8.98	9.63	9.29	9.16
d.	12.08		11.95		11.15		9.40	9.28	9.21

With all those gravimetric methods 1, 2, 3, in which the extraction of the alkaloids is carried out by shaking out with chloroform or ether and dilute acids alternately, higher and varying results are obtained, for with all the care and skill of the operator, fat and extractives are brought into the final alkaloidal residue. If, upon the contrary, the operator were to cease abstracting after using the given amount of chloroform, he would find in most cases some alkaloids still remaining in the residues.

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* This constitutes first column in table 4 and is *impure*. Lloyd's process calls for extraction of this chloroformic solution of alkaloids with dil. sulphuric acid, then addition of alkali and extraction with chloroform: this is found in second column of table 4.

Opium Assay.—D. B. Dott. Ten Gm. of powdered opium are digested with 25 C.c. water; 1.8 Gm. barium chloride, dissolved in about 12 C.c. water, is then added. The solution made up to 50 C.c. is well mixed, and after a short time filtered; 22 C.c. (representing 5 Gm. opium) are mixed with dilute sulphuric acid, in quantity just sufficient to precipitate the barium. About 1 C.c. is required, and the solution should be warmed to cause the precipitate to subside, and the solution to filter clear. To this filtered solution a little dilute ammonia, about 0.5 C.c., should be added to neutralize the free acid, and the solution concentrated to 6 or 7 C.c., and allowed to cool. One C.c. spirit and 1 C.c. ether are then added, and next ammonia in slight excess. The ammonia should be added gradually until there is no further precipitation, and a perceptible odor of ammonia remains after well stirring and breaking down any lumps with the stirring rod. After three hours the precipitate is collected on conterpoised filters and washed. Before filtering, it should be noted that the solution has a faint odor of ammonia; if not, one or two drops of ammonia solution should be added. The dried precipitate is washed with benzene or chloroform, dried and weighed. It is then titrated with $\frac{n}{10}$ acid until the morphine is neutralized, as indicated by the solution reddening litmus paper. 1 C.c. $\frac{n}{10}$ acid = .0303 Gm. morphine hydrate. That is on the usual acceptation that the hydrate is $C_{17}H_{19}NO_3H_2O$, although, as I have shown, there is good reason to believe that it has the composition $C_{17}H_{19}NO_3.9H_2O$.

The precipitate given by the barium chloride is much less bulky than that given by the B. P. process with its large quantity of lime, so that it is not difficult to allow for its volume with practical accuracy. The barium chloride not only precipitates the meconic acid, but also a large proportion of resinoid and impurities which interfere with the precipitation of morphine. The barium is entirely gotten rid of by the sulphuric acid, so that there is no risk of carbonate or basic salt of barium being present in the morphine precipitate, and so causing error in the volumetric estimation. The ammonia added is just the proper amount required to neutralize free acid and to precipitate the morphine from its hydrochloride. It is a great advantage that it is not necessary to give a longer time than three hours for the morphine to precipitate. No notice need be taken of a very slight precipitate which forms after the morphine has been filtered off, as the precipitate does not consist of morphine, but for the most part of calcium meconate. On comparing this method with that above referred to (which we might call "the proof spirit process"), he obtained 1.35 Gm. of morphine hydrate. In both cases, from the 10 Gm. of opium: = 13.5 per cent. In another opium, assayed twice by the barium chloride process, he obtained precipitates (after washing with chloroform) $a = 0.59$; $b = 0.59$. These neutralized of $\frac{n}{10}$ sulphuric acid, 16.9 C.c. and 17 C.c., indicating .51 Gm. and .515 Gm. morphine, *i. e.*, the opium was = 10.2 per cent. morphine. He does not mean to say that the results always come out so closely, but the same may truly be said of the best processes for opium assay. It would save time in the analysis if, instead of drying the precipitate and washing with benzene, the liquid containing the precipitate were washed with ether, by decantation, and the washed morphine precipitate titrated directly with the standard acid. But the method by drying the precipitate, before washing with benzene, is to be preferred.—Brit. and Col. Drug., 1894, 372.

Determination of Morphine in Opium.—Cannepin and Van Eyk call attention to a fault in the process ordinarily in use for the determination of morphine in opium, which is, namely, that a portion of the alkaloid remains in solution in the alcohol when ammonia is used as a precipitant. In experiments carried out by them this unrecovered portion varies from 70 to 170 Cgm. for 100 Gm. of opium used in the tests. They also found that a portion of the morphine is carried away in a state of solution in the wash-fluid, and further that the opium is rarely fully exhausted in the usual process of extraction.—Bull. Soc. Chim. de Paris, 1893, 437.

Extract of Poppy—The Amount of Morphine in.—B. H. Paul and A. J. Cownley examined some commercial samples of extract of poppy with the following results:

Sample.	Morphine. Per cent.
No. 1	0.72
" 2	1.34
" 3	1.61
" 4	0.77
" 5	1.14

A sample of extract made in the laboratory according to the directions of the B. P. was found to contain 1.34 per cent. of morphine, and on the assumption that the whole of the alkaloid is extracted from poppy capsules by the treatment with water, the amount contained in the capsules, deprived of seeds, was 0.28 per cent.

In regard to this point a statement was published some time since that E. Merck had given the amount of morphine in poppy capsules as 2.0 per cent. On reference to the original paper it appears that the statement above mentioned was incorrect, for the quantity of morphine obtained by Merck from 32 ounces of capsules was 18 grains, or about 0.12 per cent. That amount would approximately correspond to the strength of the three samples of extract, Nos. 1, 4 and 5, unless the yield of extract from poppy capsules is also subject to variation. In the case of the samples Nos. 2 and 3, the amount of morphine in the capsules from which they were prepared would have been more than double as much, and nearer to that found in the poppy capsules used for making our laboratory sample of extract. Syrup of poppies made from these capsules would contain rather more than half a grain (0.564) of morphine in the fluid ounce. But when made from poppy capsules, without reference to the amount of morphine they contain, it is evident that this preparation is liable to be twice as strong in some instances as it is in others.—Pharm. Jour. Trans., 1893, 521.

Titration of Morphine in Opium.—Cannepin and Van Eyk operate as follows: Ten Gm. of opium, 4 Gm. of slaked lime, are triturated carefully in a mortar, adding by portions 100 C.c. of the solution of morphine hydrochlorate indicated (0.805 Gm. per liter), and digesting for half an hour, stirring from time to time. The mixture is filtered, and the filtrate evaporated rapidly upon a water-bath at 100°. Of the filtrate a weight equal to 50 Gm. plus the weight of the fixed soluble matters yielded by 5 Gm. of opium, which makes about 52 Gm., is shaken with 10 C.c. of ether; further, ½ Gm. ammonium hydrochlorate (free from carbonate) is added and agitated until the precipitate appears, and allowed to settle for two hours. The ether is decanted and the residue thrown on a tared filter. The precipitate of morphine is collected and washed with morphine water (0.42 Gm. morphine per liter) until the filter and the precipitate are decolorized. The filter and contents are then dried in the stove at a temperature not exceeding 98° and weighed. The morphine obtained by this procedure presents all of the characters of pure crystallized morphine.—Bull. Soc. Chim. Paris, 1893, 437.

Vinegar of Opium Assay.—Lyman F. Kebler proposes the following: 100 C.c. of the vinegar of opium are rendered alkaline with strong ammonia water (8–10 C.c.) intimately mixed, 2 C.c. of ether added, to prevent frothing, vigorously shaken for 10 minutes and set aside for 6 hours or overnight. After the alkaloids are completely precipitated, pass through a filter previously wetted with water, and wash the precipitate sparingly. While the precipitate is yet decidedly moist, transfer it into a small capsule by means of a wash bottle, using as little water as possible. To the contents of the capsule add 10 C.c. of 5 per cent. sulphuric acid, or enough to render acid, warm on the water-bath, cool, allow to stand one hour or more, filter and wash the filter and residue well with distilled water. The exact process of the Pharmacopœia can be followed from here if desired' or evaporate in a tared capsule to 14 Gm., and proceed from this point as directed in the Pharmacopœia of 1890 from a corresponding point.

It is very desirable, if not necessary, to investigate the purity of the morphine by means of the lime-water test.

As a check to the gravimetric method it is recommended to titrate the morphine with a volumetric acid solution.—Amer. Jour. Pharm., 1894, 136.

Estimation of Nicotine Contained in Tobacco.—G. Went compares the methods of Kissling and Pezzolata. By Kissling's method, the extraction with dehydrated ether and ammonia, free distillate is obtained; whereby on employing the separation of Pezzolata in the direct distillation of the tobacco with magnesia no satisfactory results are produced.—Arch. der Pharm., 1893, 658.

Analysis of Tobacco.—V. Vedrödi has submitted to an experimental study each step in the methods of Kosutany and Kissling, respectively, for the estimation of nicotine. Kosutany's method consists in freeing the tobacco from ammonia by mixing with lime and exposing over acid, then washing out the free nicotine with cold water, transferring it from the watery extract to light petroleum by shaking, then removing from the petroleum solution by shaking with $\frac{n}{10}$ sulphuric acid, and titrating the excess of acid. In Kissling's method, the tobacco is mixed with weak alcoholic soda and extracted in a Soxhlet's apparatus with ether; the ether is distilled off, and the residue, mixed with strong soda solution, is distilled with steam, when the nicotine passes over and is titrated in the distillate.

The chief source of error in Kosutany's method is that the petroleum does not completely abstract the nicotine from its aqueous solution. The results obtained by Kissling's method are, on the other hand, too high, unless care be taken to get rid of ammonia completely before exhausting with ether, since the ammonia is but partially removed during the evaporation of the ether, and consequently accompanies the nicotine in the subsequent distillation with steam. Moreover, certain of the nitrogenous constituents of the tobacco are dissolved by the soda, and during the distillation yield ammonia.—Zeitschr. f. anal. Chem., 1893, 277.

Pharmaceutical Assaying by Electrolysis.—J. H. Beal considers the means necessary for electrolytic work and its adaptation in the examination of pharmaceutical chemicals.—Amer. Drug. and Pharm. Rec., 1894, 137.

Assay of Remedies Furnished by the Acids of the Aromatic Series.—To assay the salts of this series such as sodium or lithium benzoate, salicylate, etc., 20 Cgm. of the salt is shaken up with 10 C.c. of normal hydrochloric acid and 10 C.c. of ether; the mixture is cooled to 15° C.; it will be found that the ethereal layer will always measure 9.1 C.c. and contains all the acid in solution. 5 C.c. of this solution is then evaporated on the water bath, the residue dissolved in a little alcohol, and the solution saturated with decinormal solution of soda, using phenolphthalein as an indicator, and from the quantity required it is easy to calculate the quantity of pure salt; x representing the quantity found in 5 C.c., the quantity contained in 9.1 C.c. can be found by the following formula:

$$\frac{x \times 9.1}{5}$$

In assaying betol, salol, or benzonaphthol, this process must be slightly modified, as phenol and naphthol, which are here combined with the acids, are without action on phenolphthalein. 20 Gm. are placed in a graduated tube with 10 C.c. of semi-normal soda, and heated on a water bath for 15 to 20 minutes; at the end of this time the ether will be saponified, and the aromatic acid will be found in the solution as a soda salt. The proportion is calculated as in the previous method, only that the volume of the ethereal solution will be found to be 8.5 C.c. instead of 9.1 C.c.—M. Sauvaitre.—Bulletin Soc. Pharm. de Bord.; Montreal Pharm. Jour., 1894, 81.

AQUÆ.

Aqua Amydalæ Amaræ.—G. Morpargo describes and figures an apparatus for distilling bitter-almond water.—Pharm. Post, 1894, 193.

——— G. Gregos (Zeitschr. f. anal. Chem., 1894, 30) prefers Volhard's method of estimation, and describes it as follows: 100 C.c. of the bitter-almond water to be examined are mixed, in a retort of the capacity of 250 C.c., with 5 C.c. of ammonia, 50 C.c. of decinormal silver-solution, and enough nitric acid free from nitrous acid to produce a faintly acid reaction. The retort is then filled with distilled water up to the mark. After vigorous shaking and settling of the silver-cyanide, the liquid is filtered through a dry, folded filter into a dry vessel. 50 C.c. of the filtrate, mixed with a few drops of ferrous-sulphate solution, are retitrated with decinormal potassium-sulphocyanate solution. If the very first drop of the rhodanide solution produce the characteristic red coloration, too little silver-nitrate solution has been added, and the hydrocyanic acid has not been completely separated. The entire operation must then be repeated with a larger quantity of silver nitrate. For the gravimetric estimation of hydrocyanic acid, 50 C.c. of the water to be tested should be mixed, first, with 5 C.c. of ammonia and then, after stirring, immediately with 25–30 C.c. of decinormal silver-nitrate solution, and, after another stirring, with enough nitric acid to cause a feebly acid reaction. (The individual steps must be executed in rapid succession and without loss of time.) Dilute then to 200–300 C.c., collect the precipitate on a filter, and estimate the cyanogen by weighing the metallic silver. See also C. Glücksmann, in Pharm. Post, 1894, 145, 273.

Cherry-Laurel Water and Hydrocyanic Acid—Titration of.—Deniges proposes the following method, which he claims is without the objectionable features of Liebig's or Buignet's processes, especially as the end reaction is very sharp, and its exactness is not affected by differences in the composition of the fluid. Take 100 C.c. cherry-laurel water, add 10 C.c. of ammonia, and if the mixture becomes cloudy from formation of hydrobenzamide, add 5 C.c. of alcohol to clear it, then add a few drops of solution of potassium hydroxide. Then drop in decinormal solution of silver nitrate, till a permanent cloudiness is produced. Each C.c. of silver solution used corresponds to .0054 of hydrocyanic acid. For the acid of the

Codex 5 C.c. are diluted with 100 C.c. distilled water, to which is then added 10 C.c. of ammonia, and continue as for cherry-laurel water. For potassium cyanide 1 Gm. is dissolved in 1 litre of distilled water, of which 100 C.c. are taken for titration.—Jour. Pharm. Chim., 1894, 10.

To Preserve Cherry-Laurel Water.—Deschamp d'Avallon preserves cherry-laurel water indefinitely by adding one drop of sulphuric acid to every 300 or 400 Gm. (10 or 15 ounces) of the water.—Nat. Drug., 1894, 139.

The Cherry from which Kirsch-Wasser is Made.—M. de Dubor, in le Cosmos.—Nat. Drug., 1893, 117.

Chlorine water decomposes so readily that if found at all in the stores it is of poor quality. Sealed glass tubes containing five Gm. of liquid chlorine are now to be had in commerce. With one of these it is possible to extemporaneously prepare one kilo. of chlorine water.—Amer. Jour. Pharm., 1894, 223.

A Compendious Apparatus for the Production of Distilled Water.—G. W. James in Jour. Anal. and App. Chem., 1893, 273. A. Von Kaleczensky in Chem. Zeit., 1893, 2. This latter is illustrated. See also Zeitschr. f. anal. Chem., 1893, 597.

Care of Waters.—Galen, Jr., recommends that rose and orange flower water be exposed to the air occasionally, otherwise they will smell mouldy and have but little resemblance to the flowers from which made.—Amer. Drug. and Pharm. Record, 1894, 31.

Aromatic Waters.—In experimenting with the new official method for preparing "Aromatic Waters," M. A. Miner finds that in triturating 20 Gm. of calcium phosphate with 2 C.c. of volatile oil, a mobile powder is formed, which mixes readily with water on trituration, without evident separation of oily particles and furnishes a satisfactory product.—Apothecary, Jan., 1894.

Chloroform and Water.—Add a little saponine to the chloroform, agitate, and then agitate with a small quantity of water. The chloroform emulsifies, and the emulsion can forthwith be mixed with water in all proportions.—Nat. Drug., 1894, 139.

To Prevent Viscosity in Distilled Waters.—M. Carles recommends for this purpose the basic nitrate of bismuth. He makes a mixture of the material in water, by the aid of heat, and adds a little of it to the affected water. Agitation of the latter for a few minutes, and subsequent filtration, completely restores the water to its normal condition without affecting it otherwise in the least.—Ibid.

BALSAMS AND RESINS.

Solubility of Balsams and Resins.—E. Dieterich gives an extensive table of solubilities.—Helfenberger Annalen, 1893, 30; Zeitschr. f. anal. Chem., 1893, 629.

BLISTERS.

New Blister.—E. Dieterich in Helf. Annalen, 1893.

Olive oil	100 parts.
Yellow wax	525 "
Sulphuric acid	1 part.
Alcohol (90 per cent.)	10 parts.
Powdered cantharides	250 "
Barium carbonate	2 "

The wax is melted in the oil, and the mixture of alcohol and acid, and, finally, the cantharides, are added. The mass is kept for two hours at a temperature of 60–70° C., and frequently shaken. The barium carbonate is finally added, suspended in 6 parts of 90 per cent. alcohol.

Carbolic Blister and Cantharidal Vesicatories.—Olivier (Rev. d. Therap.) prefers the former, applied as follows: Wash the spot with alcohol to free from the skin fat, and then circumscribe with a protective border of petrolatum. Now moisten the spot with a wad of cotton dipped into crystallized carbolic acid, 9 parts, mixed with stronger alcohol, 1 part. After one minute remove the excess of carbolic acid with the aid of alcohol, then dress with cotton. The pain lasts for about ten minutes, then ceases. The advantages claimed are: More rapid action, less pain, absence of danger of the ahsorption of cantharidin. Causing no sores, the application may be renewed as often as needful.—West. Drug., 1894, 18.

BOUGIES.

Simple Bougie Press.—It consists of an upright closed cylinder, provided with a well-fitting piston, and is supported by a wooden base. This cylinder around its side, where it fits into the crown of the base, has holes of different sizes, each of which is provided with a suitable peg. In preparing bougies the cylinder is turned, while the base remains stationary, until the desired hole is brought between the opening in the crown, and having the medicated cacao butter in the cylinder, the piston is pressed slowly, and the bougie with the peg on its head will be pushed out, sliding along the base to the right.—Kummer, in Pharm. Zeit., 1894, 41 (Illus.).

Medicated Bougies.—Use of coat of medicated gelatin. E. Lang (Deutsch. Med. Zeit.; Meyer Bros.' Drug., 1893, 164). A solution of gelatin in glycerin and water, in proper proportions, is medicated with zinc sulpho-carbolate, one-fourth to one per cent., tannin one per cent. and upward, thallin five per cent., copper sulphate one-fourth per cent., lead acetate one per cent., resorcin five per cent., or any other appropriate remedy. In this the tube is dipped until a thick coating has adhered. The tubes are four Mm. in thickness and about sixteen Cm. in length. The inner extremity is rounded off in permitting a drop of the solution to harden on the tip, whilst the outer one Cm. is left uncovered by gelatin.

They are intended to remain in the urethra for one to five minutes, when on withdrawal the medicated gelatin will be found to have dissolved away.

CAPSULES.

Improved Capsule Material.—The following is said to be the mode of preparing an improved capsule-mass recently patented: 5 parts of tapioca and 8 parts of water are allowed to stand for four or five hours, and then transferred to an open basin and stirred for some time until the grains have all disappeared. 2 parts of sugar and 1 part of glycerin are dissolved in 8 parts of water, and mixed with the tapioca jelly whilst still warm. The whole mass is now heated for some time, and, after cooling, pressed upon linen. The thick liquid is then dried in a stove on plates of suitable thickness, and is then ready for using in the "pressure" process of making capsules or perles.—Jour. Pharm. Chim., 1893, 314.

CATHETERS.

Preservation of Catheters.—J. W. S. Gouley makes ten suggestions.—N. Y. Med. Jour.; Drug. Circ., 1893, 208. Dr. Chas. Rice has assisted in the preparation of the following saponic lubricant:

White castile soap, powdered	300 grains.
Tincture of quillaja (1 in 5)	½ fl. oz.

Water, a sufficient quantity. (Product, about 1,420 grains.)

Mode of Preparation.—Pour 2 fluid ounces of water into a tared capsule, heat the water to boiling, and add the soap. Continue the heat, and stir until a homogenous jelly is produced, then add enough hot water to make the contents of the capsule weigh two troy ounces and a half (1,200 grains) after which strain the mixture through cotton gauze. Lastly, pour in the quillaja tincture. This mixture when cool has the consistence of thick honey, possesses both viscidity and lubricity in a sufficient degree, and is free from any agent likely to be deleterious to the urethra or to the catheter. It may be preserved in an aseptic state in small collapsible tubes. The lubricant may be perfumed, or 1 per cent. of pure carbolic acid may be added. Among the experiments tried was an addition to the mixture of 2 drams of Chondrus crispus jelly (N. F.). This slightly increased the lubricity while it greatly increased the fluidity of the mixture. It is likely that the Cetraria islandica will yield similar results.

CHARTA.

Charta Salicylas.—E. Dieterich in Helf. Annalen, 1893, gives the following:

Liquid paraffin	50 Gm.
Solid paraffin	50 "
Salicylic acid	1 "

Thin absorbent paper sufficient.

Melt the paraffin together, rub up the acid well and add it to the mixed hot paraffin, and in this mixture soak strips of thin, white, absorbent paper. This is useful for chafed feet.

COLLODION.

Collodium Belladonnæ.—R. Wright, referring to the unsuitability of the root extract for preparing the liquid plaster of belladonna, as pointed out by Conroy and J. C. Umney, and the consequent necessity for a revision of the Formulary recipe, expresses the opinion that the question of going back to the leaves as a source of extract should be considered. In the case of collodium belladonnæ, the chief objection to the use of the leaves did not apply, since the green coloring material was fixed by the collodion. He found that by repercolation it was possible to prepare a fluid extract of belladonna leaves strong enough to be used for the preparation in question. It should contain not less than 0.5 per cent. of alkaloid.—Pharm. Jour. Trans., 1893, 173. (See, also, Ibid., 319.)

Collodium Belladonnæ.—W. A. H. Naylor has experimented with the B. P. C. process, and finds that not quite half the amount of alkaloid is to be obtained.—Pharm. Jour. Trans., 1894, 562.

——— Formulæ of Wright and Naylor differ in manipulation:

I. By R. Wright.

Fluid extract of belladonna leaves	10 fl. oz.
Pure ether, sp. gr. 720	10 fl. oz.
Camphor	130 grs.
Pyroxylin	183 "
Canada balsam	365 "
Castor oil	183 "

Mix the fluid extract of belladonna with the ether, and add the other ingredients. Set aside for a few days and then decant.

II. By W. A. Naylor.

Liquid extract of belladonna leaves	10 fl. oz.
Ether	10 fl. oz.
Camphor	130 grs.
Pyroxylin	183 "
Canada balsam	365 "
Castor oil	183 "

Mix the liquid extract and the ether, and set aside for twelve hours. Decant and dissolve therein the remaining ingredients in the order in which they occur in the formula.

DECOCTA.

Cinchona Decoction.—A permanent concentrated preparation: 1 Kgm. of cinchona bark is extracted with the necessary quantity of boiling water, and filtered while at a temperature of 70° C. The filtrate is quickly evaporated to about 400 C.c. and allowed to become lukewarm. The thick precipitate thus obtained is now almost completely dissolved by adding 100 C.c. of alcohol. The measure of the fluid is then brought up to 500 C.c. and kept in well-stoppered bottles. Ten C.c. of the decoction will correspond to 20 Gm. of the bark.—Pharm. Post. 1893, 373.

EFFERVESCENT SALTS.

Ferrum Citricum Effervescens.—Cesaris gives the following formula :

Iron citrate	20 parts.
Acid citric	40 "
Sodium bicarbonate	80 "
Sugar	30 "

The citrate of iron should be free from sulphate. The whole is mixed in a porcelain dish and heated to 100°. As soon as the mass begins to swell and takes the granular form, it is removed from the source of heat and the fine powder sifted off. It should be preserved in well-stoppered bottles.—Boll. Chim. Pharm., xxxii., 12.

Ferrum Lacticum Effervescens.—Ibid.

Iron lactate	20 parts.
Citric acid	40 "
Sodium bicarbonate	80 "
White sugar	30 "

Heat the mixed powders in a water bath to 100° C. when the whole will swell up and assume a fine granular form. The preparation is very hygroscopic and should, therefore, be preserved in air-tight receptacles. The taste is very agreeable.

Effervescent Granular Preparations.—Formulas in Pharm. Era, 1893, 493.

ELIXIRS.

Detannated Elixir Calisaya.—E. E. Fisher, in Amer. Drug. and Pharm. Rec., 1894, 181.

Calisaya in No 60 powder	640 grains.
Lime, calcined, in powder	1 ounce.
Glycerin	4 drachms.
Hydrochloric acid	10 minims.
Syrup	7 fluid ounces.
Oil of orange	45 minims.
Oil of lemon	10 minims.
Oil of coriander	5 minims.
Water	q. s.
Alcohol	q. s.
Fuller's earth	4 drams.

Mix the bark and lime intimately; add 3½ ounces of water, stir well, and let dry slowly. Percolate with a mixture of the acid and alcohol, adding sufficient alcohol to bring the bulk up to 4 fluid ounces. To this add the oils and, after shaking thoroughly, the glycerin, syrup, and sufficient water to make one pint; finally add the fuller's earth, shake well and filter.

Elixir Calisaya and Coca.—Ibid.

Calisaya bark, No. 60 powder	640 grains.
Oil of orange	1 dram.
Oil of lemon	10 minims.
Oil of coriander	5 minims.
Alcohol	4 fluid ounces.
Hydrochloric acid	10 minims.
Water	3 fluid ounces.
Glycerin	3 fluid ounces.
Fluid extract of coca	2 fluid ounces.
Syrup, enough to make	1 pint.

Percolate the bark with a mixture of the oils and alcohol, hydrochloric acid, glycerin and water, adding alcohol and water mixed in the above proportions to make the percolate measure 10 fluid ounces. To this percolate add the coca and sufficient syrup to make 16 fluid ounces. Add to this a little fuller's earth, shake well and filter, adding through the filter sufficient simple elixir to preserve the volume.

Elixir Iron Pyrophosphate, Quinine and Strychnine.—F. Edel, in Drug. Circ., 1894, 3.

Iron pyrophosphate	256 grs.
Quinine sulphate	128 "
Strychnine	2 "
Glycerin	of each 2 fl. oz.
Distilled water	
Aromatic elixir	enough to make 16 fl. oz.

Dissolve the strychnine in the alcohol, add the quinine and glycerin, dissolve by the aid of gentle heat, and add enough aromatic elixir to make 14 fl. oz., then dissolve the pyrophosphate in the water, with the aid of heat, add the solution to that of the other ingredients, shake well, neutralize with ammonia, and filter through calcium phosphate.

Papain Elixir.—

Papain	11.0 Gm.
Glycerin	60.0 "
Sherry wine	150.0 "
Saccharin	0.4 "
Chloroform water	sufficient to make 300 "

Keep for a week, shaking frequently, and then filter. A teaspoonful of this pleasant and palatable digestive aid and tonic will contain about two grains papain; this is sufficient for general use, and a half-tablespoonful will suffice in advanced cases of indigestion.—Chem. and Drug., 1894.

EMULSIONS.

The Pharmacy of Emulsions.—W. L. Scoville considers the theory of emulsions, emulsifying agents, rules for making emulsions.—New Eng. Drug., 1893, 323; abstract in Amer. Drug. and Pharm. Rec., 1894, 78.

Cod Liver Oil Emulsion.—Formula with syp. hypophos. comp. by Geo. E. Grover, in Registered Pharm., 1894, 29; New Eng. Drug., 1894, 219:

Cod liver oil	8 fl. oz.
Pulverized acacia	1¼ fl. z.
Oil bitter almonds	6 drops.
Oil cassia	5 drops.
Syrup of hypophosphites comp	4 fl. oz,
Cinnamon water, ad	1 pint.

M.

——— *Analyses of American.*—Leffmann and Beam. Names of preparations analyzed given in original:

Number.	Per cent. of oil claimed.	Per cent. of oil found (by volume).	Remarks.
1	50	43.9	—
2	50	49.9	Pancreatised.
3	50	49.5	—
4	63.6	44.2	Pancreatised; contains salicylic alcohol.
5	30	35.9	Much maltose.
6	50	10.7	—
7	50	18.0	—
8	—	8.4	Much maltose.
9	—	37.3	—
10	The curative agents from 25 per cent. pure Norwegian cod-liver oil.	None.	14 per cent. alcohol.

The authors consider the presence of salicylic acid with pancreatin objectionable, because it stops fermentation.—Chem. and Drug., 1893, 487.

Emulsion of Creosote by Means of Casein Saccharate is prepared by M. Léger, by adding 10 Gm. each of saccharate, casein and water to a mixture consisting of 10 Gm. each of creosote and alcohol. When, after several seconds' agitation, the emulsion is complete, sufficient water is added to make one liter. This preparation can be administered either by the mouth or rectally, and remains unchanged for a long time.—L'Union Pharm., 1893, 297; Amer. Jour. Pharm., 1893, 452.

Iodoform Emulsion.—Emulsion of iodoform is sometimes prescribed as an injection in certain kinds of fistula, and may be best prepared as follows:

Iodoform	3 parts.
Starch	1 part.

Triturate in a mortar until a fine powder results, and then add the following mixture :

Glycerin	20 parts.
Water	12 "

Warm gradually, and stir constantly until 133° C. is reached. The resulting emulsion will be 10 per cent., and is very stable. Moreover, it is found to act more energetically than the emulsion prepared in the ordinary way.—Brit. Med. Jour., Jan. 7, 1893.

Petroleum Emulsion.—F. A. Seiker (Notes on New Rem., 1893, 102) employs S. A. McDonnel's formula with success, but employs petrolatum liquid instead of vaseline oil in the formula :

Vaseline oil	16 fl. oz.
Powd. acacia	8 oz.
Glycerin	4 fl. oz.
Calc. hypophosph., Sod. hypophosph	each 286 grs.
Water	sufficient to make 3 pt.

Triturate the oil with acacia in a large mortar, and add 1 pint of water all at once, triturating rapidly till emulsified. Dissolve the hypophosphites in ½ pint of water, and add this. Then add the glycerin, and sufficient water to make three pints.

EMPLASTRA.

Unna's Plaster Mulls.—According to H. R. Bigelow (Med. News, Sept., 1893; Notes on New Rem., 1893, 127) plaster mulls are an ideal improvement on the ordinary spread plasters ; fine gauze is covered with the thinnest possible layer of gutta-percha, on which the medicament is evenly spread, properly dissolved in a minimum quantity of vehicle or base. The gutta-percha covers the skin-surface hermetically, prevents transpiration from the pores, and thus facilitates the deeper absorption of the medicament and enhances the specific therapeutic effect of the indicated remedy. The vehicle or base employed is non-irritant and a solvent of the remedy. Of the latter, an exact amount or dosage is added, and being perfectly dissolved, every particle of the ointment-surface will act equally ; in other words, the plaster-mulls offer a sort of specific medication. A chief advantage besides this exact dosage is that the plaster-mulls are so thin, elastic and pliable, that they can be closely affixed to any portion of the body without cutting or patching. No artificial heat or other manipulation is necessary for applying these plaster-mulls ; simply placing them on the surface requiring treatment, and holding them there for a moment, suffices to firmly attach the plaster to the skin by virtue of the body-heat.

Liquid Belladonna Plaster.—W. A. H. Naylor (See Collodion).

New Plaster Mass.—Pharm. Centralh., 1893, 393.

Caoutchouc	50 parts.
Honey	5 parts.
Soap plaster	45 parts.

This mass is used also as the base in the following plasters, in which the active ingredient is expressed as per cent.:

Anthrarobin plaster	25	per cent.
Alum plaster	20	"
Ergot plaster	10	"
Bismuth subiodide plaster	30	"
Sulphur plaster	30	"
Chamomile plaster	10	"
Belladonna plaster	20	"
Phytolacca plaster	20	"

EXTRACTA.

Preparation of Fluid Extracts.—According to Desvignes (Pharm. Ztsch. f. Russl.), a mixture of alcohol and glycerin does not exhaust drugs any better than alcohol alone, and protracts the process of extraction. The use of finely-powdered substances is inadmissible. With some drugs the ingredients of which partly alter in the second part of the operation of distillation or evaporation, a slight addition of glycerin will enable them to remain soluble; but this, the author says, is the only case where he would use glycerin in preparing fluid extracts. He proposes the following procedure: Gather the first ⅘ of the percolate, which will contain, with a slow process of extraction, ¾ of the extractable substances. The process is now continued to exhaustion, which generally requires 5–6 times the weight of solvents. The last quantities of alcohol are displaced with distilled water. The percolates obtained after the setting aside of the first ⅘ are now united and evaporated at as low a temperature as possible to ⅕ of the weight of the drug employed. When perfectly cooled, the two extracts are mixed and set aside for a while. In most cases, mixture takes place without turbidity, which proves that the dissolved extractive matter has not been changed any by the evaporation. Sometimes, however, the extractive matter becomes impaired in its solubility, in which case a small quantity of glycerin suffices to restore its clear solubility. This circumstance should, of course, be taken into consideration in calculating the total weight. The fluid extracts are to be filtered after 4–5 days' absolute rest.—Merck's Mark. Rep., Sept., 1893.

Estimation of Glycerin in Fluid Extract.—O. Linde publishes the following method, which has proven to give fair results (a loss of 5 or 6 per cent. by evaporation is not to be avoided) with the fluid extracts of frangula, hydrastis, cascara sagrada and ergot, while the fluid extract of condurango, however, always gave high results, caused by the solubility of one or more of the constituents in water and ether-alcohol; 10 Gm. of the fluid extract are evaporated to 5 Gm., the residue dissolved in 50 C.c. water, and solution of lead subacetate added drop by drop until the precipitation is complete; the precipitate is allowed to subside, when the clear liquid is filtered through a water-wetted filter, and then the precipitate transferred and washed with water; the filtrate is acidified with a few drops of diluted sulphuric acid, a concentrated solution of phospho-tungstic acid added until precipitation ceases, and the mixture filtered and washed as before; the filtrate is now made alkaline with dilute solution of sodium hydrate, evaporated to syrupy consistency, 30 C.c. of a mixture of equal volumes of absolute alcohol and ether added, the mixture filtered and the insoluble matter washed with ether-alcohol; the ether-alcohol solution is evaporated in a tared flask, having a long neck, and dried to constant weight. The residue is almost pure glycerin, contaminated generally with but a little coloring matter.—Pharm. Centralh., 1894, 39; also Pharm. Ztg., 1894, 144.

Powdered Medicinal Extracts.—W. B. Thompson gives some general views and cautions regarding this class of preparations.—Amer. Jour. Pharm., 1894, 182.

Solid Extracts for Ointments.—These are best kept on hand in the form of glycerites. They are fitly prepared by bringing together equal weights of extract, glycerin and water, and after effecting thorough mergence, evaporating the water by heating the mixture on a water-bath until its weight equals that of the extract and glycerin combined. They are also especially useful in the formation of pills. As the strength is reduced one-half, double the quantity prescribed must be used.—Beginnings in Pharmacy; Pharm. Era, 1894, 350.

Copper in Extracts.—Analysis of the following drugs for copper:

	Per kilo. Drug.	Per kilo. Extract.
Cort. cinch. succirubr	8.0	14.0
Herb. cannabis ind.	30.0	24.0
" conii	18.0	11.0
Fol. belladonnæ	7.2	29.0
Herb. hyoscyami	11.2	4.2
Rad. filicis mar. I	14.8	33.0
" " " II	14.4	
" aconiti	12.0	4.0
" bellad	5.2	10.0
" glycyrrh. Morav.	15.6	
" " decort. russica	16.0	16.0
Secale cornut	12.0	16.0
Semen nuc. vomica	26.4	24.0

Potassium, sodium, calcium, magnesium, aluminium, iron, and manganese are the more common bases found in the ash of drugs; but it seems that copper must not be regarded as an altogether abnormal constituent.—Pharm. Zeit., xxxix., 30.

Fluid Extract of Belladonna.—Wright and Naylor suggest that this extract for collodium belladonnæ be prepared as follows:

I. By R. Wright.

English belladonna leaves in fine powder	1 pound.
Alcohol, a sufficient quantity.	

Moisten half a pound of the powdered drug with menstruum, pack in a conical percolator, add a further supply of menstruum, allow percolation to proceed, and collect the percolate in three fractions of six fluid ounces each. Moisten the rest of the powder with a little of the first fraction of percolate, pack in a second percolator; pour over it the remainder of the first fraction of the percolate, and when that is absorbed, add the second fraction, and finally as much of the third fraction as may be required to produce eight fluid ounces of percolate.

This fluid extract should contain not less than 0.5 per cent. alkaloid.

II. By W. A. Naylor.

Belladonna leaves in No. 60 powder	20 oz.
Alcohol, a sufficient quantity.	

Moisten the powder with 15 fluid ounces of the alcohol, pack it tightly in a percolator, and pour on sufficient menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop, close the lower orifice and macerate for twenty-four hours; then allow percolation to proceed, gradually adding menstruum until the belladonna is wholly deprived of alkaloid. Reserve the first seven ounces of the percolate, distil off the alcohol from the remainder, and evaporate the residue to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the liquid extract measure 10 fluid ounces.—Pharm. Jour. Trans., 1893, 173.

Powdered Extract of Cannabis Indica.—J. McFarlane considers the somewhat marked variation in the physical characteristics of the extract as met in commerce. The author recommends all commercial products to be examined as to solubility in alcohol.—Bull. Pharm., 1894, 154.

Extract of Chestnut Bark.—In a Foreign Office Report (No. 1270, Annual Series, 1893) the following particulars are given respecting this new tanning material prepared in the neighborhood of St. Malo, France: "This export is developing. It is used in the process of tanning leather, being made of the bark of chestnut trees. The export has reached 150 tons to 200 tons per month, and it is expected that the new manufactory of this essence now about to be opened at Dinan will double the export hence. The only manufactory in this district at present is at Montreuil-sur-Ille in this department." This information supplements that conveyed in a Foreign Office Report (No. 578, Annual Series, 1889) on the trade of Corsica, where it is stated that "Chestnut extracts (from Ajaccio) for tanning purposes have been in demand for England, and considerable quantities have been shipped." It is said that these chestnut extracts are used for tanning purposes to modify the color produced by hemlock extracts obtained from the hemlock spruce (*Tsuga canadensis*).—Kew Bulletin, August, 1893.

Fluid Extract of Digitalis has been admitted into the Danish Pharmacopœia, which has recently made its appearance, and according to Et. Fayn (Jour. de Pharm. d'Anvers, August, 1893, p. 298), figures for the first time in any European Pharmacopœia. The Pharmacopœia directs the maceration for two hours of 1,000 p. digitalis leaves with 50 p. glycerin and 450 p. dilute alcohol, percolation with 6,000 p. dilute alcohol, and then distillation on a vapor bath, until not more than 1,000 p. remain; the extract is then diluted with 2,000 p. water, evaporated to 1,500 p., filtered and again submitted to evaporation to 500 p., to which 500 p. alcohol are added to obtain 1,000 p. by weight. The extract is of a dark green color, and yields on the addition of 50 p. water a yellowish green limpid liquid. The maximum dose is given as 0.10–0.50 Gm. Unless otherwise specified by the physician, an infusion of digitalis may be dispensed by adding water to the above extract in the required proportion.—Amer. Jour. Pharm., 1893, 550.

Extract of Ergot.—C. C. Keller (Schweiz. Wochenschr. f. Pharm., 1894, 141). One thousand parts of ergot are dampened uniformly with 500 parts of diluted alcohol and allowed to stand for twelve hours in a well-covered vessel. The moist powder is passed through a sieve and fully exhausted in a percolator with diluted alcohol. If the percolation is properly conducted this is accomplished when the percolate amounts to about four or five times the weight of the ergot. The percolate is now evaporated to 250 parts in a vacuum, if possible, and with constant stirring. Now add 250 parts of water, warm for a short time, and allow to cool, when oily and resinous masses will separate out. Filter and to the clear dark reddish-brown filtrate add 50 parts of 10 per cent. hydrochloric acid. Shake up the liquid and allow to stand for 24 hours. The sclererythrin, the coloring matter of ergot, will then separate out in a flocculent precipitate. Now filter and wash and to the filtrate add 20 parts of crystallized sodium carbonate. When the evolution of carbon dioxide ceases, evaporate to 150 parts; finally add 15 parts of glycerin and evaporate to 125 parts. One part of the extract now represents eight parts of the ergot. It is of a thin, almost liquid consistence.

According to the Swiss Pharmacopœia, the aqueous solution of the extract (1 to 20) should be of a reddish-yellow color. Extracts which are not prepared according to the above formula yield a dark brown solution. If three C.c. of this solution of the extract is diluted with 7 C.c. of alcohol, the mixture should remain perfectly clear even after standing some time. Other extracts will yield a precipitate. The aqueous extract should turn litmus paper to a light red (alkaline solutions are easily decomposed). On the addition of iodide of mercury and potassium no muddiness should follow. An excess of acid causes pain when the solution is injected. If Mayer's reagent be mixed with a solution of the extract and hydrochloric acid added, a copious yellowish-white precipitate would form (extracts not made according to this formula yield dark precipitates).

Ten C.c. of the extract solution (1 to 20), on being acidified with 5 drops of diluted hydrochloric acid and on addition of one C.c. of picric acid solution (1 to 150), should become muddy at once, and yield a flocculent precipitate after a few minutes. This reaction is a direct and approximately quantitative test of the quantity of the active alkaloid ot ergot present, since the flocculent precipitate yielded from a preparation prepared carefully according to the Swiss Pharmacopœia consists practically of cornutine picrate. The ergotinic acid and its decomposition alkaloids are not precipitated under these conditions. Only an ergot rich in alkaloid and an extract carefully prepared will show the reaction indicated. The cornutine in the precipitate can be identified by the usual test after having been isolated by means of hydrochloric acid, ammonia, etc.

For hypodermic use the following solution is recommended:

	Parts.
Extract of ergot (as above)	50
Sterilized water	25
Glycerin	25

One part of this solution represents four parts of ergot. The writer is unable to confirm the view of Kobert that all extract solutions lose their activity in a relatively short time, since he has found the proportion of cornutine present in a fluid extract made from a Spanish ergot unchanged after many years.

The writer finds only traces of cornutine in Bonjean's extract. Of three commercial ergotines intended for hypodermic injection, two were found to be alkaline and the third strongly acid, two contained no cornutine at all, and the third only traces thereof.

Aided by the investigation of the properties of cornutine, it has recently become possible to prepare an extract of ergot which, while free from ergotinic acid, still contains the total amount of alkaloid in a relatively very pure form. Investigations as regards the action of such preparations, its uses and clinical applications, etc., are now in progress.

Extract Filicis.—H. Beckurts examined 2 extracts and found them to contain copper in small amounts (0.044 to 0.135 per cent.).—Apoth. Zeit., 1893, 594.

Extract Filicis.—Weppen and Luders obtained copper in 3 commercial extracts. It is best determined by ignition of extract, and treating ash with HCl and obtaining Cu by any of the chemical methods.—Ibid., 722.

Extract of male-fern prepared without the use of copper utensils has a yellowish-green color; if prepared in a copper vessel this normal color is changed to a pure green, and, hence, Peters recommends the examination for copper in all pure green colored extracts.—Ibid., 594.

Fluid Extract of Hydrastis Canadensis is warmly recommended by Dr. Br. Olzewski, of Cracow, as an almost infallible anti-diaphoretic. His experience in ninety-three cases proved that the profuse diaphoresis observed in many diseases may be checked by two or three daily doses of 25 to 30 drops. If the sweats subsequently occur, repeat the cure. No vomiting was observed to follow administration, save in two cases.—Wiener Med. Bl.; Notes on New Rem., 1894, 82.

Fluid Extract of Licorice and Ammonium Chloride.—J. E. Morrison has compared a number of fluid extracts with the view of ascertaining what fluid extracts produce the customary precipitate. His conclusions are: That in the B. P. liquid extract the glycyrrhizin is precipitated as well as in the U. S. P. extracts, and if a certain maker's extract does not do so, it is because it contains little or none of the glucoside, which is the most important constituent of licorice; that the precipitate produced on adding ammonium chloride is mainly glycyrrhizin; that the more aqueous the extract menstruum, the smaller the precipitate. B. P. liquid extract, which is made by macerating in water, concentrating to specific gravity 1.160 and adding one-sixth of its volume of rectified spirit (1 lb. of root yields about 8 ounces liquid extract) forms the best preparation, although there is a slight precipitate. The fluid extract of the U. S. P. 1890, made with water of ammonia, 5 per cent.; alcohol, 30 per cent.; and water, 65 per cent., gives a smaller precipitate, and one more easily diffused than that of the 1880 Pharmacopœia, which is made with water of ammonia, 3 per cent., and diluted alcohol, 97 per cent.; and at the same time disguises the taste better than that of the B. P., as the ammoniacal solvent extracts a larger proportion of glycyrrhizin than water alone.—Montreal Pharm. Jour., 1893, 147; West. Drug., 1894, 131.

Extract of Licorice.—Kremel, in Pharm. Post. 1894, 100. E. Etescher, in Ibid., 105. An examination of the insoluble portion; the amount of ash and glycyrrhizin contained in Spanish licorice.

Purified Alcoholic Extract of Licorice.—E. Dieterich in Helf. Annalen, 1893.

Russian liquorice, coarsely powdered	1,000 Gm.
Alcohol, 90 per cent	1,000 Gm.
Water	sufficient.

Pour 5 kilogrammes of cold water over the licorice, allow to stand for four hours, stirring frequently, and then press out. Extract the press cake with 3 kilos of boiling water and again press out. Mix the two liquid extracts, and at once evaporate to 500 Gm. and add to the solution while hot one kilo of alcohol, and allow to stand for twenty-four hours. Then filter through paper and from the filtrate distill off 900 Gm. (20⅓ fluid ounces). Evaporate the residue to a medium thick extract consistence. The extract is completely soluble in water. The yield is about 180 to 200 Gm. (6 to 6½ ounces). It is necessary, particularly in summer, to perform the operation rapidly; by beginning at 6 in the morning one can be ready by midday to go on with the evaporation, and the alcohol can be added by evening.

Fld. Ext. of Glycyrrhiza as a Foam Producer.—R. J. Fritzinger claims that none of the objections that hold good and lessen the value of other agents of this class apply to this Fld. Ext.—Amer. Drug. and Pharm. Rec., 1893, 152.

Extract of Logwood.—E. Donath finds that commercial extract of logwood contains a notable quantity of nitrogen in a soluble form, and that the ash is higher in proportion and richer in chlorides and phosphates than it was in an extract prepared by himself. These differences he attributes to the sprinkling of the logwood with putrid urine during the processes of fermentation to which it is subjected in order to convert the hæmatoxylin into hæmatëin.—Chem. Zeit., 1894, 277.

Extract of Malt—Constituents of.—H. Helbing and F. W. Passmore (Helbing's Pharm. Rec., July, 1893, 13) examined seven preparations with the following results:

	Color and Consistency.	Odor and Flavor.	Percentage of Water.	Diastatic Power. Digest equal Weights of Starch.	Sugar as Maltose.	Specific Rotation.	Ash per cent.	Phosphoric Acid. (per cent.)
1	Very thick, pale brown.	Malty and aromatic.	25.48	In 9 min.	61.1 per cent.	+ 77.8	1.19	0.55
2	Thin, pale brown.	Scarcely perceptible odor, sweet taste, not malty.	27.87	In 30 min.	56.1 per cent.	+ 69.4	1.5	0.25
3	Thin, light brown.	Slightly malty odor, disagreeable taste.	35.89	In 15 min.	56.8 per cent.	+ 66.5	1.09	0.47
4	Very thick, pale brown.	Slightly malty acrid aftertaste.	26.81	Not in 24 hours.	61.6 per cent.	+ 78.4	1.37	0.44
5	Thick, pale yellow.	Slightly malty, very sweet.	26.44	In 55 min.	55.3 per cent.	+ 63.4	1.13	0.29
6	Very thick, light brown	Slightly malty, but musty.	26.33	In 12 min.	60.5 per cent.	+ 71.2	1.26	0.38
7	Thick, light brown.	Sweet fruity odor, acrid and offensive taste.	29.61	In 35 min.	56.6 per cent.	+ 68.6	1.41	0.21

Meat Extracts and Preparations.—A table containing the per cent. of albumose and peptone in twenty commercial preparations.—F. Goldmann in Pharm. Post, 1894, 1.

Practical Malting.—A. Hart Remington gives a new method of malting as carried on at Oswego. A large supply of water from an artesian well was developed near the malt-house; the water, due to the fact of its coming from a great depth, is very cold and it does not vary one degree, either in summer or in winter. Air is forced into a chamber, through which this cold water is sprayed, with the result of decreasing the temperature to the desired degree; the air is then conducted through flues under a perforated sheet-iron floor, on which is laid the steeped grain, which always has the cold currents of air (forced by Sturtevant blowers) permeating through it. This process controls the temperature, prolongs the season for malting, and obviates the necessity of so much attention, prevents mold, and also renders the germination more uniform.

The malt thus prepared is generally sold to brewers and to manufacturers of malt extracts on contracts, as on account of the limitations of the season of manufacture, it is necessary to provide for a supply for a long time ahead.—Amer. Drug. and Pharm. Rec., 1894, 229.

Extractum Quebracho.—Kremel calls attention to the fact that there appears in the Austrian market an extract bearing the above name, which is made from another bark Loxopterygium Lorentzii, also known as the bark of "Quebracho colorado," the true quebracho being known as "Quebracho blanco." To this similarity in names is attributed the above substitution; the true extract, owing to its alkaloidal constituent, gives with tannin a precipitate, the extract of quebracho colorado does not contain an alkaloid, hence, will not react with tannin; on the contrary, owing to the tannin which it contains, will cause a precipitate when added to a solution of the true extract.—Pharm. Ztg., 1894, 91.

Extractum Rosarum Spirituosum.—E. Dieterich in Helfenberger Annalen, 1893.

Rose leaves, cut moderately coarse	1,000 Gm.
Diluted alcohol, 68 per cent	5,000 Gm.
Glycerin	sufficient.

Pour the diluted alcohol on the rose leaves and allow it to stand at 15 to 20 degrees C. for twenty-four hours, express and evaporate the resulting fluid 500 Gm. Allow the evaporated extract to stand for twenty-four hours at the room temperature, filter and evaporate the filtrate to a syrupy consistence. Then add sufficient glycerin to bring the whole up to 250 Gm. Of this extract, which is clearly soluble, 25 Gm. is sufficient to make one kilo of honey of rose (mel. rosatum).

Animal Extracts as Therapeutic Agents.—F. C. Larkin (Pharm. Jour. Trans., 1894, 743), in a lecture describes the animal therapeutics of the ancients and enters into the historical side of this subject and the consideration of the developments of recent years. The modern administration of animal extracts may be classed into two groups: 1. The descendant of the idea of giving foxes' lungs for diseased lungs and extract of brains for diseased brains. Its great apostle is Brown-Sequard. 2. The descendant of the idea of giving extract of vipers for snake-bites, or of "a hair of the dog that bit him." Its chief apostles are M. Pasteur and Dr. Koch. In the first a product of a healthy part is given to cure disease of a similar organ in man. In the second a product of a diseased animal is given to cure or prevent the same disease in man. In dealing with the first the lecturer detailed the theories first advanced by Brown-Sequard, and then gave examples of his experiments with the testicular extracts from various animals, and added that most English observers have not got the good results with testicular juice that Brown-Sequard says he has had. The various processes adopted by Brown-Sequard to secure a perfectly sterilized solution were referred to. Dr. Larkin also spoke of the thyroid gland, and in conclusion, said that the evidence brought forward proved that the administration of animal extracts is of undoubted service.

Gland Extracts.—General remarks upon value in Chem. and Drug.; Drug. Bull., 1894, 133, 220.

Toxicity of Thyroid Extract.—Chantemesse and René Marie describe a case of myxœdema in which injections of thyroid extract, though producing a decided ameliorating effect, in extra strong doses caused vertigo and considerable discomfort, the symptoms being decidedly toxic. A sheep was, therefore, experimented upon with the extract during several months, and a marked elevation of temperature was noted to follow the injection of any unusually strong dose. The discomfort produced caused the animal to become very irritable, and on several occasions it broke down the walls of the place in which it was confined. When, however, the injections ceased, the animal soon recovered its normal health and condition.—Soc. med. des hôpitâux through Nouv. rem., x., 104; Pharm. Jour. Trans., 1894, 818.

GAUZE AND GOSSYPIUM.

Assay of Iodoform Gauze.—Fr. Gay gives the following process: The gauze is rolled up and placed in a bath of 90 per cent. alcohol, in a Soxhlet percolator, connected with a reflux condenser and attached to a flask, into which an alcoholic solution of caustic potassa is introduced. If a ten per cent. gauze is operated upon, the strength of the solution should be 5 Gm. of potassa to 100 C.c. alcohol. The apparatus is placed on a water-bath and heated until the gauze and the alcohol are entirely decolorized. The alcoholic liquids are united and diluted with water to 250 C.c., filtered, and 10 C.c. of the product are neutralized with acetic acid and estimated with normal silver nitrate solution. The process can also be applied to the direct estimation of iodoform.—Rèp. de Pharm., 1893, 298.

Antiseptic Cottons—Number of Bacteria Contained in Some.—Results of examination as to number of colonies from both the inner and outer portions of wool. The author also examined carbolated cotton which claimed to be 10 per cent.—found 5 to 6 per cent. Iodoform gauze that claimed to be 10 per cent., contained 6.1 per cent.; 20 per cent., contained but 13.5 per cent.—Pharm. Post, 1893, 447. (See also Ibid., 475.)

The Action of Cotton on Sublimate has been demonstrated by Leo Vignon (Laboratoire de Chim. appliq.), whose investigation leads him to the following conclusions: Bleached cotton, immersed in dilute aqueous or alcoholic solution of sublimate, absorbs proportionately more mercuric oxide than hydrochloric acid; the mercury absorbed is only partially soluble in water as $HgCl_2$, a portion being retained as HgO and Hg_2Cl_2, and time diminishing the soluble quantity, and increasing that which is insoluble in water. These observations will be of service in the preparation of sublimate bandages.—Jour. Pharm. Chim., 1893, 13.

Benzoin—Alumina Cotton, a substitute for the ferric chloride cotton, is recommended by Giulio Morpurgo as a hæmostatic preparation, because it is efficient and at the same time does not stain the containers. It is made by boiling the solution of aluminum acetate with benzoin, straining, and at once impregnating the cotton. The prepared cotton is white and has a very pleasant odor; a considerable quantity of finely divided benzoin is separated upon the fibres, assisting by a mechanical action the astringent properties of the alumina.—Pharm. Post, 1893, 357.

New Substitute for Cotton.—A setaceous fibre covering the seeds of the Bombax petandum and of the Eriodendrum anfractuosum—trees growing 90 to 100 feet in height—is called "Kapok." It grows best upon high altitudes and the best qualities are found in the islands of the Indian Archipelago, Java, Bombay, Sumatra and the Peninsula of Malacca. The Kapok fibres are shrunken, and when of good quality are very elastic. It is used to some extent in the arts, but experiments have been made recently for dressing wounds with it. It may be used for making pyroxylin. The seeds yield an oil resembling that of cotton seed, it possesses some advantages over the cotton.—Jour. Soc. Chem., Ind.; New Eng. Drug., 1894, 135.

GELATINA.

Gelatina Zinci Carbonatis.—E. Dieterich (Helf. Annalen, 1893):

Zinc sulphate	30 Gm.
Sodium carbonate	30 Gm.
Glycerin	40 Gm.
Gelatin	10 Gm.
Distilled water, sufficient quantity.	

Dissolve the zinc sulphate to a clear solution in 200 Gm. of distilled water. Dissolve the sodium carbonate in 200 Gm. of distilled water, filter each solution, mix and wash the resulting precipitate until free from sulphate. Place this in a cylindrical vessel, the bottom of which is covered by a linen cloth, allow it to drain and pour the glycerin upon the precipitate. Collect the liquid that drips off and use this to swell the gelatin. Now weigh the mixture of glycerin and precipitate, also weigh the gelatin solution, mix the latter with the precipitate, warming gently, and lastly add sufficient distilled water to make the whole weigh 100 Gm.

Gelatina Zinco-Thioli.—Ibid.:

Thiol liquid	10 Gm.
Gelatin	15 Gm.
Zinc oxide	15 Gm.
Glycerin	25 Gm.
Distilled water	35 Gm.

GLYCERITA.

Stability of Glycerite of Starch.—In M. Patel's opinion this can be attained by heating the mixture at an elevated temperature a sufficient length of time to dissolve all the starch granules. M. Chapelle, while admitting the stability of the preparation by this means, says that the product has not the proper creamy consistence, and that success depends only upon the nature of the material used, while M. Muller recommends the addition of a little gum tragacanth.—Bulletin Commercial; Amer. Jour. Pharm., 1893, 388.

Glycerite of Yerba Santa.—F. Edel (Drug. Circ., 1894, 3):

Fluid extract of yerba santa	2 fl. oz.
Solution of potassa	720 grs.
Comp. fl. ext. of cardamom	½ fl. oz.
Oil of sassafras Oil of lemon Oil of clove	of each, 16 min.
Water	3 fl. oz.
Glycerin	6 fl. oz.
Alcohol Talcum	of each, a sufficient quantity.

Rub the oils, extracts, and potassa solution, with the water; add 2 fl. oz. of the alcohol, and the talcum; after thorough trituration, filter clear and to this filtrate add the glycerin and enough alcohol to make 1 pint [473 C.c.].

Four fluid ounces of this glycerite suffice to make one pint of syrup or elixir to correspond with the N. F.

INFUSA.

The Preservation of Infusions.—E. White sterilizes the flask which is to hold the infusion by boiling distilled water in it for ten minutes, and then the infusion is poured into it and the neck immediately closed with sterilized wool. If in any case it might be thought admissible, the raising of the contents of the flask to the boiling point after plugging renders their preservation more certain. In case of cold-water infusions such as calumba and quassia, filtration through the kieselguhr block of a Berkefeld filter into a sterilized flask is recommended. Flasks being inconvenient for keeping these preparations, the author has devised bottles with taps at the bottom, and the mouth closed by a rubber cork through which a thistle-funnel, plugged with sterilized cotton wool, passes. Rinsing several times with sterilized water before adding the infusion is sufficient sterilization if it be not required to keep the infusion for more than a month.—Pharm. Jour. Trans., 1894, 686.

Infusions of Calumba and Quassia.—F. H. Alcock (Pharm. Jour. Trans., 1894, 694) gives tables of amount of extractive matter in Mgs. per fluid ounce of infusion. The variations were from 66 to 156 in calumba, and 6 to 26 Mgs. in quassia.

Infusion of Gentian (Compound).—Barclay (Ibid., 693) examined 8 samples with the following results:

No. of Sample.	Sp. Gr.	Extractive dried at 100 C. Per cent.	Proof spirit. Per cent.	Appearance.
B. P.		0.855		
1	1.013	7.2	21.11	Very slightly opal.
2	0.9835	2.3	38.87	Almost bright.
3	0.994	4.3	31.61	Bright.
4	0.987	2.7	35.47	Bright.
5	0.9945	3.8	31.03	Brilliant dark.
6	0.999	4.24	24.36	Bright dark.
7	1.005	5.52	23.54	Slightly opal.
8	1.010	6.47	21.11	Slightly opal.

A pint of compound infusion of gentian was next prepared, according to the directions of the Pharmacopœia, and gave .855 per cent. of extractive matter. It will be seen that a concentrated preparation holding in solution eight times the amount of extractive matter found in the fresh infusion should yield 6.84 per cent. of extractive. Only two of the specimens examined approached this figure; the majority contained very much less. The aroma and taste of the samples also varied considerably; the smell of the lemon was apparent in some, in others quite absent; one sample had a distinct odor of citronella, reminding one of an inferior hair oil, while the amount of bitterness also differed considerably in the different samples.

LINIMENTA.

Linimentum Saponis.—J. T. Hornblower recommends the use of soft soap and gives six reasons for this.—Chem. and Drug., 1894, 571.

Liniment of Iodide of Potassium and Superfatted Soap.—J. R. Johnson prepares (1) a neutral superfatted soap as follows:

Benzoated lard	100 parts.
Caustic potash	27.3 "

Having thus prepared a neutral soap, it is an easy matter to put in an additional 5 per cent. of lard; thus the figures for exact neutrality are, in percentage:

Benzoated lard	78.56
Caustic potash	21.44

with added 5 per cent. lard—

Benzoated lard	79.56
Caustic potash	20.42

or for a convenient quantity—

Benzoated lard	1 lb.
Caustic potash	4 oz. 56 grains.

In dealing with such a quantity, the potash is best previously dissolved in 4 ounces of water, and the benzoated lard and solution of potash kept well stirred together over a water-bath for three or four days, to ensure perfect combination. The resulting soap is fairly firm, somewhat resembling "crême d'amande" in consistency and appearance, but rather firmer.

(2) To prepare the liniment of iodide of potassium with this superfatted soap, the following formula will be found to yield an excellent result:

Of 5 per cent. of superfatted soap as above prepared	1 oz.
Iodide of potassium	1 fl. dr.
Distilled water	6 fl. dr.

Dissolve the salt in the distilled water; warm the soap with about half of the solution in a porcelain dish over a steam or water-bath, gradually add the rest of the solution, and beat together with a spatula until cold. The product is a smooth and white, creamy liniment, rubbing into the skin in a manner far preferable to the present uncertain pharmacopœial preparation. It is important in making the liniment to follow the above directions closely, as any other method ends in failure so far as the elegance of the liniment is concerned.—Pharm. Jour. Trans., 1894, 1045.

LIQUORES.

Solution of Aluminum Acetate—New Process.—The Jour. de Pharm.

d'Anvers gives the following: Dissolve 30 parts of aluminum sulphate in 60 parts of distilled water, and add 36 parts of acetic acid dilute (Ger. Pharm.). Mix 13 parts of calcium carbonate with 20 parts of water, and add the mixture to the solution first made, under constant stirring. In order to ensure the presence of all the calcium carbonate, rinse the vessel in which the mixture was made, and add the water to the solution. Let the whole stand for twenty-four hours with an occasional agitation, or until it is absolutely certain that all free carbonic acid has escaped, and then weigh the liquid, and if necessary, add sufficient water to make a total of 171.50 parts.

To test for aluminum oxide, proceed as follows: Evaporate 10 grams of the liquid in a tared platinum capsule, heat to a red heat, and then weigh. The residue should weigh from 26 to 31 Cgm.—Nat. Drug., 1894, 42.

Stable Boric Acid Solution.—It is proposed to prepare a solution of boric acid in glycerin by digesting them at a temperature of 46° C. In this manner a gelatinous cream is obtained readily soluble in water and suitable for use in medicine.—Pharm. Era, 1894, 220.

Butyl-Chloral Hydrate Solutions.—Experiments by Chem. and Drug., 1894, 316, on alcoholic solutions. Two and a half drachms of the hydrate was dissolved in 5 fl. dr. of absolute alcohol. To 3 drachms of the solution, immediately it was made, 1½ oz. of cold distilled water was added, and oily drops separated, which were not dissolved or apparently reduced by agitation. A further ½ oz. of water resulted in a clear solution. When the alcoholic solution was a day old, each drachm of it required 1 oz. of cold distilled water to dissolve the oily drops and effect a clear solution.

The solution in rectified spirit has different characteristics. Two drachms of the hydrate was dissolved in 5 fl. dr. of spirit, and of this solution 3 drachms was treated at once with 9 drachms of cold distilled water. Although the proportion of alcohol in this mixture was larger than in the previous case, the separated globules had a denser appearance, and the aqueous portion was milky. Complete and clear solution was gradually effected by the use altogether of 21 fl. dr. of water; but 3 oz. was required for the same quantity of spirituous solution a day old. Even with hot water there is a separation of globules. Thus, to 2 drachms of the spirituous solution 1 oz. of distilled water at 180° F. was added; there were still separation and opalescence, the latter not disappearing when more water (½ oz.) was added, nor when the mixture was cooled down to the normal temperature. It appears, therefore, that although slightly less hot water is required to effect solution of butyl-chloral hydrate, this is done at the expense of elegance, and the advantage in point of actual solubility is so slight—say, as 1 to 6 is to 1 to 7—that it would be better to avoid the hot water. Moreover, the opalescence is undoubtedly due to some slight decomposition. The foregoing experiments were subsequently corroborated, and it was observed that the older the alcoholic solutions became the quickness of their solution in water diminished, although the actual solubility did not much decrease. The oily globules are butyl-chloral alcoholate, $C_4H_5Cl_3O.C_2H_5HO$. This body is practically insoluble in water, and when it does dissolve therein it is as $C_4H_5Cl_3O.H_2O$.

Simultaneously with the foregoing experiments the solution of butyl-chloral hydrate in glycerin was also examined. It is almost as soluble in glycerin as in alcohol, but the viscidity of the former makes solution slow. Three drachms of the hydrate was dissolved in 7 fl. dr. of glycerin heated to 180° F. Two drachms of this solution dissolved in 11 drachms of water form a slightly opalescent mixture. The glycerin solution mixed with its own volume of cold distilled water is quite clear and permanent, so that water reduces the viscidity of the solution admirably. As more water is added, the solution becomes milky; but there is no separation of globules, and the solution clears up as we go on adding water.

It is obvious from the figures given that glycerin is a better solvent aid than rectified spirit for dispensing purposes. All the solutions had practically the same strength—viz.: 1 in 33 of the finished product—yet we find that 1 part of the absolute alcohol one required 5.3 parts of water, 1 part of the rectified spirit solution required 7 parts of water, and the same of glycerin solution required only 5.5 parts. Obviously glycerin has the advantage. The only objectionable point is the opalescence; but that is easily avoided by making the solution by trituration in the cold. Upon this basis a useful dispensing solution of butyl-chloral hydrate may be made, and it is always advisable to avoid spirit as a solvent.

Chlorinated Lime Solutions.—G. Lunge and F. Bachofen (Zeitschr. f. angew. Chem., 1893, 326) have determined the specific gravities of chlorinated lime solutions at 15°, and making allowance for calcium chloride and chlorate contained therein, find that the respective specific gravities indicate the following amounts of free chlorine in grams per litre:

Specific Gravity.	Free Chlorine.	Specific Gravity.	Free Chlorine.
1.115	71.50	1.055	32.68
1.110	68.00	1.050	29.60
1.105	64.50	1.045	26.62
1.100	61.50	1.040	23.75
1.095	58.40	1.035	20.44
1.090	55.18	1.030	17.36
1.085	52.27	1.025	14.47
1.080	49.96	1.020	11.41
1.075	45.70	1.015	8.48
1.070	42.31	1.010	5.58
1.065	39.10	1.005	2.71
1.060	35.81	1.0025	1.40

Liquor Croci.—

Saffron, cut small	1 part.
Rectified spirit	15 parts.
Water	5 parts.

Macerate at a gentle heat, strain, and press.

The proportion of saffron is the same as in the B. P. tincture, but the extraction is far more complete.—Canad. Drug.; Chem. and Drug., 1893, 151.

Liquor Ammonii Ergotinici.—A solution of which one C.c. represents three Gm. of ergot or three decigrams of ammonium ergotinate, is claimed to be a solution of the salts of a decomposition product of ergot, which while retaining the full activity of the drug, is more permanent and reliable than the preparation made directly from the drug; the dose is 15 to 20 drops; for subcutaneous injection the charge of a Pravaz syringe.—A. Voswinkel, Pharm. Ztg., 1894, 100.

Stable Solution of Ergotin.—Nouv. Rem., Chem. and Drug., 1893, 491.

Ergotin	gr. xv.
Acid. carbolic	gr. iss.
Aq. dest	♏lxxv.

Solve et filtra.

Liquor Ferri Peptonati.—(*0.6 per cent. Fe.*).—24 Gms. dry iron peptonate are dissolved in 200 Gm. hot distilled water. The cooled solution is mixed with 200 Gm. simple syrup and 100 Gm. liq. sodæ dil. (1.9) so that the precipitate is dissolved. The clear solution is then mixed with 370 Gm. distilled water; 100 Gm. alcohol; 3 Gm. tr. aurantii; 1.5 Gm. tr. aromatica; 1.5 Gm. tr. vanillæ; 5 gtts. aether aceticus.—Apoth. Soc., Berlin; Pharm. Rund., 1893, 185.

Liquor Ferri Peptonati cum Mangano.—(0.6 per cent. Fe. and 1 per cent. Mn.)—24 Gm. dry iron peptonate are dissolved in 200 Gm. hot distilled water; the cold solution is mixed with 200 Gm. simple syrup and 100 Gm. liq. sodæ dil. (1.9). The clear liquid is mixed with 50 Gm. liquor mangani glucosati (2 per cent.). To the solution, which is alkaline, is added 320 Gm. distilled water; 100 Gm. alcohol; 3 Gm. tr. aurantii; 1.5 Gm. tr. aromatica; 1.5 tr. vanillæ; 5 gtts. aether aceticus.—Apoth. Soc. Berlin; Pharm. Rund., 1893, 185.

Liquor Ferri Mangan. Sacchar.—(0.6 per cent. Fe. and 1 per cent. Mn.) 200 Gm. Ferri oxid. sacch. (Ph. G., III.) are dissolved in 644 Gm. of distilled water, and mixed with 50 Gm. liq. mangan. glucosat. (2 per cent.); 100 Gm. alcohol; 3 Gm. tr. aurantii; 1.5 tr. aromatica; 1.5 tr. vanillæ; 5 gtts. aether aceticus.—Apoth. Soc. Berlin; Pharm. Rund., 1893, 185.

Liquor Ferri Acetatis.—E. Dieterich calls attention that in the test with HCl, water and KI, too little iron is used.—Helfenberger Annalen, 1892; Chem. Zeit. (Rep.), 1893, 206.

Alkaline Solution of Peptonate of Iron.—15.5 Gm. pure peptone dissolved in 80 Gm. water, are mixed with 185 Gm. solution of oxychloride of iron, (Ph. G. III,) and the mixture carefully neutralized with solution of soda; the precipitate is collected, washed until free from chlorine, warmed with 200 Gm. simple syrup, solution of soda carefully added until the precipitate is dissolved, and diluted with water to 1,000 Gm.—(Berl. Apoth. Ver.) Apoth. Ztg., 1893, 370.

Stable Solution of Iron Iodide.—Farm. Ital.; Amer. Drug. and Pharm. Rec., 1893, 343.

	Parts by weight.
Iodine	75
Iron	45
Distilled water	50
Sugar	100
Glycerin	q. s. ft. 450

Mix the iron, iodine and water. When the reaction is finished filter and add the sugar and glycerin, warm until clear, and then bottle, stopping up carefully.

Preparation of Iron—Note on a.—D. B. Dott calls attention to a ferrous preparation (of foreign origin) in which the iron is said to be in a peculiar state of combination, which renders it specially easy of assimilation. Upon examination he found it to be evidently a weak, rather acid solution of ferrous chloride with a little common salt.—Pharm. Jour. Trans., 1894, 631.

Gold Bromide and Arsenic Solution.—F. A. Sieker (Notes on New Rem., 1893, 202) prepares a solution similar to that put upon the market (the formula of which is kept a secret) as follows:

Arsenous acid	18¾ gr.
Bromine water	q. s. or about 2¼ oz. troy.
Gold tribromide	24 gr.
Distilled water, enough to make	16 fl. oz.

Introduce the arsenous acid and 2⅛ oz. of bromine water into a flask or porcelain capsule and heat gently until all free bromine has disappeared. Then add bromine water, 10 to 20 drops at a time, until it shall be present in slight excess, or until the solution does not become colorless after some time. Expel the excess of bromine with the aid of a gentle heat, dilute to 16 fl. ozs. and dissolve in this the gold tribromide. The result, if the oxidation of arsenous acid is complete, will be a perfectly transparent red solution, 10 minims of which contain $\frac{1}{32}$ gr. of gold tribromide and the equivalent of $\frac{1}{16}$ grain arsenic tribromide.

The oxidation of arsenous acid into arsenic acid by the bromine takes place according to the equation:

$$As_2O_3+2Br_2+5H_2O=2H_3AsO_4+4HBr.$$

Gold Bromide and Arsenic Solution.—Attempts to prove that Barclay's solution of gold and arsenic bromide and a similar solution (see above) behave differently under parallel chemical tests.—Amer. Drug. and Pharm. Rec., 1894, 149.

——— F. A. Sieker considers this question at length and concludes:

1. An aqueous solution of arsenous bromide and gold bromide has not been accomplished.

2. Bachmann's and Barclay's solutions contain gold bromide, arsenic acid and hydrobromic acid in aqueous solution, as was proven by his analysis.

3. Arsenic bromide ($AsBr_5$) has never been isolated.—Notes on New Rem., 1894, 179.

Solution of Subacetate of Lead.—Courtonne recommends the following method as perfectly reliable: Dissolve 75 parts (by weight) of neutral, crystallized acetate of lead in 165 parts of water, and add 11 parts of ammonia of 22° B. (0.923). This solution is immediately ready for use, and always of uniform strength, it is stated.—Chem. Zeit. (Rep.), 1894.

Magnesium Citrate—Extemporaneous Solution.—Frank Edel, in Merck's Market Rep., 1894, 192.

Calcined magnesia	83 grains	[5.4 Gm.].
Powdered citric acid	437 "	[28 "].
Syrup citric acid	2½ fl. oz.	[75C.c.].
Distilled water	q. s.	

Mix the acid and magnesia, either in a mortar or in the bottle, with 3 fluid ounces [90 C.c.] of warm water, shake or stir till solution takes place, and then add the syrup and enough water to make 10 fluid ounces [295 C.c.]. Next add 40 grains [2.6 Gm.] of potassium bicarbonate, and cork securely. This formula is said to yield a nice preparation, corresponding with the solution made from the carbonate by the formula suggested by Prof. Patch. It can be prepared in a few minutes.

Liquor Mangani Glucosati.—(2 per cent. Mn.) 87 Gms. $K_2Mn_2O_2$ are dissolved in 5,000 Gm. boiling distilled water, cooled to 60° C. and then 50 Gm. glucose are added. Allow to stand for one hour. The precipitate is separated by means of a cloth and light pressure, and warmed in a porcelain dish with a mixture of 600 Gm. glucose and 225 Gm. liq. sodæ (Ph. G., III.); the solution is diluted with distilled water, to which alcohol has been added to make it 5 per cent., and made up to weight equal to 1,500 Gm. To obtain manganese glucosate in a powdered form the mixture is dried and mixed with sufficient white sugar to make the product weigh 1,000 Gm. The resultant powder, readily soluble in water, contains 3 per cent. Mn.—Apoth. Soc. Berlin; Pharm. Rund., 1893, 185.

Filtration of Pepsin Solutions is facilitated by the addition of sugar of milk, which exerts merely a mechanical action and causes the liquid to remain limpid.—Wearn, in Gior. di farm. et di chim., June, 1893, through Rép. Pharm., 1893, 320.

Permanganate Solutions.—Grützner has practically proved that a permanganate solution 1 in 1,000 undergoes no change on exposure to diffused daylight for one year, and in one year and a half only to the extent of 2.61 per cent. In blackened glass the amount of change was considerably less. —Chem. and Drug., 1893, 865.

Corrosive Sublimate—Preservation of Solution of.—Schill recommends the employment of acetic acid in the following proportions:

Bichloride of mercury	1
Acetic acid	5
Water	94

This solution exposed to the light will not give rise to any of the subchloride. Johnson, of Liverpool, prefers to pass free chlorine into the solution. It may be noted that solutions of sublimate only decompose very slightly when exposed to the light if they are preserved in well-closed bottles made of a glass free from alkali. The turbidity occurring in these mercurial solutions appears to be, in part at least, due to traces of ammonia gas in the laboratory, and Johnson's process provides a trace of free HCl, which neutralizes this ammonia. It may be noticed that the amount of acetic acid suggested by Schill is too much. The merest trace of acids, even the hydrocyanic acid in cherry-laurel water, will effectually prevent the precipitation.—Rép. de Pharm., 1893, 28.

Mercuric Chloride Solutions—Stability of.—Tanret. The formation of a white precipitate in dilute solutions of mercuric chloride is due to the presence of ammonia in the atmosphere, and does not take place with pure air even when large quantities of the latter are passed through the liquid.—Compt. Rend., 1893, 1081.

Aqueous Solutions of Mercuric Chloride—Stability of.—E. Burcker concludes from his experiments that common waters, on account of the substances which they contain, cause the immediate decomposition of mercuric chloride. The decomposition continues under the influence of air, light, and of the mineral and organic matters present in the water or introduced by the air. The decomposition ceases or becomes insignificant if the solution is withdrawn from the action of air and light. The solution of mercuric chloride prepared with pure distilled water undergoes merely insignificant decomposition, even when it remains exposed to air and light.—Compt. Rend., cxviii., 1305.

Stability of Dilute Solutions of Mercuric Chloride—Léo Vignon.—The changes produced with time in dilute solutions of mercuric chloride are chiefly due to the introduction of alkaline matter, whether by the water used in preparing the solution, or by the air, or by glass vessels containing the solutions. To these agencies must be added the influence of dust or of organic bodies, the contact of which reduces mercuric oxide and facilitates the precipitation of the mercury.—Compt. Rend , cxviii., No. 20.

Determination of Mercury in Dilute Solutions of Mercuric Chloride.—L. L. de Koninck recommends in solutions at $\frac{1}{100000}$ the colorimetric method. He treats the solution under examination with hydrogen sulphide and compares the brown tint obtained with those furnished under identical conditions with solutions of mercuric chloride of known concentration.—Chem. News, 1894, 13; from Rev. Univ. Mines Met., xxiii., No. 3.

——— The following method is recommended by L. Vignon (Chem. News, 1893, No. 1757): Take 50 C.c. of a 1:1000 solution of corrosive sublimate; add 5 C.c. of pure hydrochloric acid at 22° B. (1.180), and 10 C.c. of a saturated, clear solution of hydrogen sulphide. A yellow precipitate is obtained which quickly becomes black. Filter on a filter which has been previously weighed to one-tenth of a milligramme. The precipitate is washed, dried, and weighed. It is useful to operate in comparison with a check filter, through which has been filtered a mixture of 50 C.c. of distilled water, 5 C.c. of hydrochloric acid, and 10 C.c. of H_2S, which is washed like the foregoing. The weighing of this check-filter, of the same size and the same paper as the filter containing the mercury sulphide, furnishes a means for correction.—Compt. Rend., 1893, 793.

Solutions of Morphine Chlorhydrate.—A. Berlioz says not only is it indispensable not to employ an alkaline glass, but it is useful not to exceed 110° C. in the autoclave.—Jour. Pharm. Chim., 1894, 410.

Aqueous Solutions of Morphine.—P. Welmans. (Chem. Centralb., 1893, 230). As is known, morphine hydrochlorate dissolves in 25 parts of water at 15° C., and in $\frac{4}{5}$ part of boiling water; but solution in hot water takes place with partial *decomposition* indicated by a change of color to yellow. This is caused, according to the author, by the oxidation of morphine into oxidimorphine; and this process seems to require oxygen in statu nascendi, since a morphine solution prepared cold and then heated to boiling, will nearly not color at all when air is passed through it. The author assumes that the oxygen is either condensed on the surface of the morphine, or is very loosely combined with it, and is suddenly liberated on dissolving in hot water. A yellowish-brown coloration of the morphine solutions is produced likewise by such oxidizing agents as $KClO_3$ and H_2SO_4 or H_2O_2. We should, therefore, not employ a temperature exceeding 40° C. in dissolving morphine, and should avoid too rapid solution by violent shaking, so that the oxygen has time to escape without causing decomposition. From the oxidized morphine no morphine can be regenerated by means of reduction.

Liquor Potassii Arsenitis.—C. Lonnes has made numerous experiments and considers the following as yielding a clear and perfect liquid: 1 Gm. As_2O_3, is heated with 10 C.c. of a normal KOH solution, and after cooling mixed with 40 Gm. water and 15 Gm. tinct. cardam. co. (?). Then 10 C.c. KOH solution is added, and finally water to make 100 Gm.—Pharm. Zeit., 1894, 90; Chem. Zeit., 1894 (Rep.), 31.

Fowler's Solution.—Bräutigam finds that the precipitate often found in Fowler's solution is composed principally of silicic acid, due to the action of the alkali on the glass.—West. Drug., 1893, 327.

Formula for Fowler's Solution.—Quinquand and Portes in La Méd. Scientif.; Nat. Drug., 1894, 41. An unalterable solution of arsenite of potassium may be made by following the process of Traub, viz.: Dissolve by aid of heat, 1 Gm. of arsenous acid in 5 C.c. of caustic potash. Dilute by adding 30 Gm. of water, 40 Gm. of alcohol, and 10 Gm. spirit of melissa. Finally add sufficient alcohol to make 100 Gm. The dose is from 10 to 15 drops in the course of twenty-four hours.

Arsenous Acid in Fowler's Solution, and Antimonous Oxide in Tartar Emetic—New Volumetric Method for Estimating.—H. Győry (Zeitschr. f. Anal. Chem., 1893, No. 32, 415), observed that in titrating tartar emetic with iodine in alkaline solution, the termination of the reaction is difficult to determine with certainty. Experiments for the purpose of titrating tartar emetic as well as arsenous acid in acid solution, yielded favorable results. Bromine in statu nascendi served as the means of oxidation. The process was conducted as follows: 0.5 to 1 Gm. of potassium bromide was dissolved in 5 C.c. of Fowler's solution, diluted with about 10 C.c. of water and acidulated with 10 per cent. hydrochloric acid. A drop of methyl orange solution (1 : 1000) was then added, and the whole titrated with $\frac{N}{10}$ potassium bromate solution, shaking constantly until the rose color disappeared and the solution became colorless. By adding even one drop too much of the bromate solution, the liquid will be colored yellow, from the presence of free bromine.

In estimating tartar emetic about 0.3 Gm. of the salt and 25 C.c. of 10 per cent. hydrochloric acid are employed, in order to prevent the precipitation of antimony oxychloride. The estimation of both substances is simplified by titrating with potassium bromate alone, without the addition of bromide; in this case the bromic acid itself oxidizes the arsenous—or antimonous oxide—as the following equation indicates:

$$3As_2O_3 + 2KBrO_3 + 2HCl = 3AsO_5 + 2KCl + 2HBr.$$

The reaction may also be explained thus: Free chlorine and bromine develop by the mutual alternating action of bromic and hydrochloric acids:

$$KBrO_3 + 6HCl = KCl + 3H_2O + 5Cl + Br.$$

Sterilization of Hypodermic Solutions.—Berlioz and Duflocq have prepared tubes (yellow) hermetically sealed to contain but one dose (½ Cm. to 1 Cm.) of the medicament. Operation of sterilization is figured of tubes and syringe with arrangement of tubes. The authors employ yellow glass to store the experimental solutions in, so that decomposition due to the effects of light might be avoided; but the composition of the solution did not remain unaltered, and the change was different according to the composition of the glass used. A description of the experiments undertaken then follows, and the conclusions arrived at show that many varieties of glass, when in contact with solutions of morphine hydrochloride, cause the deposition of pure morphine in fine crystals on the sides of the flask, and thus correspondingly weaken the strength of the solution. The author also insists that in sterilizing morphine solution 110° C. should be the highest temperature reached.—Rep. de Pharm., 1894, 49.

New Fungoid Growth in Quinine Solutions.—M. Heim communicates to the Bulletin de la Société Mycologique a description of a new fungus, which produces an abundant mycelium in solution of sulphate of quinine. It produces fructification, which proves it to belong to the genus Aspergillus. The discoverer proposes to call it Aspergillus quininæ sp. n. (?). —Nature.—Brit. and Col. Drug., 1894, 503.

Hypodermic Solutions of Salts of Quinine.—In L'Union Médicale (Ther. Gazette) there is an interesting article upon the hypodermic injection of quinine, in which the following solubilities of the various salts are given: One part of neutral hydrochlorate is soluble in .66 of water; neutral sulphovinate, .70; neutral lactate, 2.00; basic sulphovinate, 3.30; neutral hydrobromate, 6.33; neutral sulphate, 9.00; basic lactate, 10.29; basic hydrochlorate, 21.40; basic hydrobromate, 45.02; basic sulphate, 581.

The neutral hydrochlorate is by far the most soluble of the salts of quinine for hypodermic use, and is, in addition, rich in alkaloid. The sulphovinate is also very soluble, but is not so advantageous. It has been found that the addition of antipyrin aids in the solubility of the quinine. As is well known, the hypodermic injection of quinine forms an important part of the treatment of cases of severe malarial poisoning.—Amer. Drug. and Pharm. Rec., 1894, 110.

Saccharine Solutions.—Solubility of Metallic Salts.—J. Stern and J. Fraenkel have observed that the salts of almost all heavy metals are soluble in a solution of inverted sugar, but not in cane sugar. Saccharine solutions of the salts of copper, silver, mercury and platinum are reduced by boiling; those of copper to its oxide, those of others to the metallic state. Auric salts, on the other hand, are directly reduced by mixing their solutions with inverted sugar. Salts of lead, iron, nickel, cobalt, chromium and manganese are unreducible in this way.—Drug. Circ., 1894, 57.

Concentrated Solution of Salicylic Acid.—Jandon prepares two solutions as follows:

1.	Salicylic acid	8 Gm.
	Alcohol (90 per cent.)	24 Gm.
2.	Sodium borate	4 Gm.
	Glycerin	8 Gm.

Mix these two solutions and then add sufficient distilled water to make 100 Gm.—Rép. de Pharm., 1894, 341.

Boro-Salicylic Acid Solution containing four Gm. each of boric and salicylic acids in a liter, proposed by Cesaris and Carcano, has been found of such value in an Italian hospital that it completely replaced the mercuric chloride solution. The addition of the boric acid adds permanency to the salicylic acid solution; the strength of the solution can be increased so as to contain six Gm. salicylic acid per liter, although this solution was only occasionally used.—(Bollet. Chim. Farm.), Pharm. Ztg., 1893, 594.

Darkening of Sodium-Salicylate Solutions prepared from salicylic acid and sodium bicarbonate, may be prevented, according to Hardt (Pharm. Ztg., 1893, 780), by avoiding heat, and employing a slight excess of salicylic acid. A small quantity of acid should be added after neutralization, and the solution then filtered.

Solution of Nitrate of Silver.—Roux has ascertained the cause of the explosion of a bottle filled with indelible ink made of nitrate of silver. Oxygen develops simultaneously with N_2O_5. This unites with the elements of water:

$$2AgNO_3 = 2Ag + N_2O_5 + O$$
$$N_2O_5 + H_2O = 2HNO_3.$$

As all these inks contain sodium carbonate and ammonia, in which the silver carbonate (formed from $AgNO_3 + Na_2CO_3$) is dissolved; and as the ammonia is frequently not at hand in sufficient quantity, the nitric acid must decompose the silver and sodium carbonate. The carbonic acid and the oxygen finally cause the explosion. To prevent a repetition of such accidents, Roux thinks that a sufficient ammount of ammonia should be added, and that dark flasks or bottles should be used.—Pharm. Post., 1893, No. 22.

Solutions of Silica—Decomposition of.—G. Gore (Nature, 49, 272) describes the results of experiments in which solutions of acids, alkalies or salts having no chemical action upon pure precipitated silica or other suitable insoluble powder, were agitated in stoppered bottles with the powder, set aside for some time and the clear liquids subsequently analyzed. It was found that the power of abstracting dissolved substances from liquids is a common property of finely divided solid bodies, and that the amount abstracted varies with the kind of powder employed; with the degree of fineness and, consequently, the amount of surface of the powder; with the kind of substance dissolved; the proportion of powder to dissolved substance; the kind of solvent; the proportion of solvent to powder; the proportion of dissolved substance to solvent, and, to some extent, with the temperature. Finely precipitated silica possesses the property of abstraction in the greatest degree, and alkaline substances in solution are most affected, silica abstracting more than 80 per cent. of the dissolved substance in very dilute alkaline solutions. The results obtained with silica and a very weak solution of iodine are said to indicate a possible method of extracting the latter from solutions and afterwards recovering it from the silica by distillation.

Liquor Strychniæ Hydrochloratis—The Crystals Deposited in.—Wm. Duncan (Chem. and Drug., 1894, 310) conclusively proved that, although many acid salts of this alkaloid were well known to exist, the crystals formed in acid solutions of strychnine hydrochlorate were merely the neutral salt, and not the acid salt, as had been assumed.

Zinc-Chloride Solution.—P. Carles claims that the dry or moist zinc chloride of the trade almost always contains zinc oxide; and when it is dissolved, a rise of temperature takes place which favors the solution also of a part of the zinc oxide it contains. The quantity of dissolved zinc oxide increases with the rise of temperature, and, of course, with the amount of zinc chloride employed. If the solution be filtered immediately after the chloride has been dissolved, the filtered and limpid solutions will soon become turbid; it is, therefore, necessary to wait until the solution has completely cooled, before filtering. The precipitate formed is described as zinc oxychloride, which, when examined under the microscope, is seen in the form of hexagonal crystals or fragile needles. It is easy to understand that such solutions are painful, when injected hypodermically. Furthermore, it should not be overlooked that a cooled solution of zinc chloride becomes turbid on adding water; such solutions should hence be filtered only after the addition of all the water they are to contain. Finally, said solutions should always be prepared with distilled water; ordinary water containing, as it does, calcium carbonate, produces a precipitate of oxychloride five times as abundant as that caused by distilled water.—Rép. de Pharm., 1894, 97; Jour. Pharm. Chim., 1894, 157.

MISTURÆ.

Mist. Olei Ricini, B. P.—R. C. Cowley prepares this mixture in from three to five minutes by mixing the oils, potash and syrup thoroughly in a mortar and adding the water gradually at the end.—Pharm. Jour. Trans., 1894, 742.

Bromoform in Mixtures.—C. Van Wisselingh (Apoth. Ztg., 1894, 379) proposes another method, consisting in distributing the bromoform in an oily emulsion, taking for each 2 grammes of bromoform, 4 grammes each of olive oil and acacia. The bromoform is shaken with the thick emulsion of olive oil and the other ingredients of the mixture, if there be any, are then added. It is true that the bromoform will, on standing, again separate from such a mixture; but an intimate and even distribution can easily be obtained again by agitation.

Copper Arsenite Mixtures.—Copper arsenite is now being more or less used in diarrhœa, and occasionally it has been ordered in mixture form, instead of the usual pill. In such cases it is advisable to add a few drops of diluted hydrochloric acid, to dissolve the arsenical salt, or if the mixture be alkaline the compound will not be dissolved. Attfield states it is wholly insoluble in water. Whether dilute HCl affects the chemical character of the arsenite is unstated by Attfield, but even if it does, it would be a most dangerous procedure to dispense the mixture, simply holding it in suspension.—Pacific Drug Review, January, 1893.

OLEATES.

Oleates.—E. Williams prepares mercury oleate as follows: Place the mortar in a pan of boiling water and introduce the weighed oleic acid into the mortar; then continue the heat to 100° F., dust the mercury oxide into it, and stir until solution is effected (which takes about 15 minutes). Mercury oleate (10 per cent.) thus prepared is said to keep a month. The author thinks that a true oleate should be made by precipitation, and diluted as required. A good method is to make a saturated solution of Castile soap in water, allowing it to stand for a day to get rid of some of the sodium palmitate, which will deposit, decanting the clear solution and filtering. The filtrate will be composed principally of sodium oleate, with some palmitate. Make a solution of a neutral salt of the metal, and precipitate the oleate by reacting on the soap solution. The solution of the metal must not be acid, or we should get some free oleo-palmitic acid. In the case of mercury we should require to keep it boiling briskly for two or three minutes, to aggregate the particles. This precipitate—an oleo-palmitate of the metal—can be strained, and adherent water got rid of by evaporation in the water-bath. The oleate may be separated from the palmitate by dissolving out with petroleum-benzin or ether, which will dissolve the oleate, but not the palmitate. The filtered benzin solution, evaporated, will yield the oleate in a fair state of purity. This would be a real oleate, and not a mixture or a solution of the metal in the oleic acid; it could be diluted to any strength with lanolin, spermaceti ointment, or even oleic acid.—Chem. and Drug., 1894, 273.

Oleate of Mercury.—Frank Edel finds the process of Beringer by double decomposition to be best. The formula for oleate of potassium is as follows:

Oleic acid	gr.	1000
Potassa	"	220
Alcohol	fl. dr.	6
Water	enough.	

Dissolve the potassa in 2 ounces of water; after having heated the oleic acid, gently add the potassa solution to it, a small portion at a time, stirring constantly. Toward the last dissolve a small portion of the resultant soap in the alcohol, and test with phenolphthalein, ending the operation when the solution remains a light pink. Then add the alcohol and dilute with water to 2 pints. This gives a neutral oleate of potassium. If the operator should not desire, however, to go to so much pains in making the preparation, he may add the whole amount of the potassa solution gradually, and after stirring thoroughly and saponification being complete, add the 2 pints of water. This may then be filtered or strained.

Then make a solution of mercuric nitrate in as small an excess of nitric acid as possible, as follows:

Yellow oxide of mercury	gr.	383
Nitric acid	"	323
Water	fl. oz.	1

Mix the water and acid in a porcelain evaporating dish, add the mercuric oxide gradually, and apply heat if the mercury does not all dissolve, adding more acid carefully to insure perfect solution. Then dilute to 4 fl. oz.

Heat the solution of potassium oleate to about 150° F. and add the solution of mercury, stirring all the time. The resultant oleate of mercury must be thoroughly washed with clear water to remove the nitrate of potassium, and then rubbed under a bone spatula on a pill tile in order to remove the water. The result is a product that will keep well with ordinary precautions, and from it the weaker percentage oleate can be made as wanted.

The following table shows the different percentage strengths, taking 100 grains of the normal oleate as a basis, and which is brought to the required strength by diluting with the amount of oleic acid indicated:

To make 5	per cent.	oleate of mercury	add	466	gr.	oleic acid.
6	"	"	"	371	"	"
7	"	"	"	304	"	"
8	"	"	"	254	"	"
9	"	"	"	214	"	"
10	"	"	"	183	"	"
12	"	"	"	136	"	"
14	"	"	"	102	"	"
15	"	"	"	89	"	"
16	"	"	"	77	"	"
18	"	"	"	56	"	"
20	"	"	"	41	"	"

Thus any percentage can readily be made from the normal oleate and the trouble from decomposition avoided.—West. Drug., 1894, 85.

PASTILLES.

Pastilles of Kola Extract:

Extract of kola	1 gr.
Powd. chocolate	10 "
Powd. milk sugar	1 "
Syrup	q. s.

Triturate the extract and milk sugar, so as to form a pulverulent mixture, then add the chocolate and enough syrup to form a mass, which is then divided into 10 pastilles.—M. F. Gay, in Rev. Pharm. de Gand., Montreal Pharm. Jour., 1894, 53.

PILULÆ.

Pill Excipient for General Use.—N. A. Upham recommends the following:

Acacia, powdered	1 dr.
Tragacanth, powdered	2 "
Glucose	5 "
Glycerin	3 oz.

Mix the powders in a suitable dish and thoroughly incorporate the glycerin and glucose until a perfectly smooth mixture is obtained. Then apply sufficient heat to thicken. When cold, transfer to a screw-cap ointment jar or other convenient receptacle. This excipient, he says, will produce results in the majority of instances which combine the qualities generally demanded, and does away with the half-dozen or more sticky and untidy excipient bottles so often found behind the prescription counter.—West. Drug., 1894, 54; New Eng. Drug., 1893, 367.

Salol as a Material for Coating Pills.—Salol has already been recommended as a pill coating, for this purpose by Ceppi and Yvon, but they proposed using it in the form of an ether solution. That mode of application was not found to give good results, the deposit of salol upon the pills being too friable and readily rubbed off. Oeder prefers to apply salol in a melted condition for coating pills, and the operation is carried out in an enameled sheet iron tray, upon the bottom of which some powdered salol is melted over a spirit lamp or gas flame. The pills are then placed in the tray and rolled in the melted salol, sufficient heat being applied meanwhile to prevent solidification until the surfaces of the pills are coated with a thin layer. The heating is then discontinued and the rolling of the pills kept up for about one minute, until they have sufficiently cooled. For thirty pills of average size the quantity of salol requisite is from a gramme to a gramme and a half, but if the pills are not sufficiently coated in one operation the treatment must be repeated. The pills should have a uniform translucent coating, free from cracks or bare places, and the quantity of salol on each pill need not exceed two centigrammes. Oeder states that he has succeeded in obtaining a sufficient coating with as little as five milligrammes, and even in the case of the largest sized pills the salol coating need not exceed one decigramme. In carrying out the operation the chief point to be observed is to avoid heating too much, as that would have the effect of decomposing the salol. The low melting point of salol (40°–43° C.) facilitates the operation. and if that temperature is not exceeded the substance may be repeatedly melted without undergoing alteration.—G. Oeder, Pharm. Zeit., xxxviii., 527.

Salol-Coated Pills.—F. Gerhard.—Salol has been recently recommended for the coating of pills intended to pass through the stomach unchanged, and to be dissolved and act in the intestines. The advantages claimed for it are: 1. It is a harmless, safe and impermeable transmitter of medicaments through the stomach; 2. It is certain to be dissolved in the intestine, and the pills are easily and quickly prepared; 3. Any pill ingredient can be used, the melting point of which is not considerably below 50° C. (132° F.).—Pharm. Zeit., 1893, 410.

——— C. E. Sonnenburg describes a method of coating pills as follows: Into an enameled tin pan pour a small quantity of salol. Any other vessel of non-attackable substance may be used, taking good care that the sides are not too thick, so that they cool quickly. In the middle or in one corner, pour the salol. Thirty ordinary-sized pills will require 15 to 25 grains. The salol is heated in the pan, melting to an aromatic, colorless, oily liquid. The entire bottom of the pan is then carefully heated, so that the salol is not chilled too suddenly, thereby rendering the coating irregular. Throw into the melted salol about 30 pills, still keeping the pan warmed by holding it over the flame. Remove the pills after they appear to be sufficiently coated, from that pan into another, keeping them rolling from one side to the other to prevent sticking. In about one minute or sooner the coating will become hard and assume a glassy appearance. Should it appear insufficient, heat the coating pan, put in a small quantity more of salol, lay the pills with the first coating carefully in it, and proceed as at first. This re-coating can be done three or four times or more if necessary. The pills are perfect when they assume a grayish-white transparent appearance free from holes or cracks of the minutest character. Generally ⅓ grain of salol is sufficient to coat one pill; on the other hand 0.075 grain has answered the same purpose.

If by accident the coating should become too thick it can easily be reduced by melting some of it off. This is best done by cleaning the pan thoroughly, in which the pills were coated, laying them therein and constantly rolling, warming the pan over the flame. Some of the coating will melt from the pills and adhere to the bottom of the pan. This must be done with great care so as to prevent an irregular coating. If desired, the entire coating can in this way be removed, and the original process gone through again.

Regarding the preparation, keeping and dispensing of salol coated pills the following is given:

1. Overheating and boiling the salol interferes with the cooling considerably. The salol can be remelted with a gentle heat a number of times without the least damage.

2. Roughness in rolling the pills is to be guarded against, because the dried coating is apt to become cracked, which is just the thing to be prevented. But at the same time, it is not necessary to be over careful; the coating will stand a considerable number of mechanical insults. Allowing the pills to fall on a hard surface any considerable distance will crack them. These should not be used at all, or they may be re-coated.

3. In order that the coated pills may be prevented from too rough handling it is best to keep them between layers of thin cotton. They may be dispensed in boxes as well as bottles.

4. Keep the pills in a cool, dark place, away from the sun's rays and the stove; salol melts at about 40° C.

5. The pills should not be given in combination with other remedies in which salol is soluble (oil, etc.). It is well to advise the patient as to how they should be kept and taken.

6. The pills are best given one hour after meals, so as to give the food time to assume the temperature of the body. They are not recommended to be taken on an empty stomach, but just to the contrary. Oily food should be avoided as much as possible.

7. Should the patient experience a slight griping pain in the stomach, a warm draught of some kind (tea or coffee) will facilitate the action of the pill and relieve the pain by passing it from the stomach into the bowels.—Drug. Circ., 1894, 123.

Pill-coating.—M. Fauël communicates the following method for pill-coating to the Pharm. Weekblad:

The pills are uniformly moistened with a liquid composed of one part of glycerin and two parts of strong alcohol; they are then rolled in a sufficient quantity of impalpable power, composed of saccharin, 4 parts; gum tragacanth, 2 parts, and potato starch, 1 part. Remove the excess of powder by means of a sieve, and repeat the operation. To have the pills white, they are then moistened with glycerin, 1 part, ether 2 parts, and rolled in a powder composed of equal parts of talc and carbonate of calcium. The following are the author's formulas for cacao and gelatin coating respectively: I. Cacao, 2 parts; saccharin, 2 parts, and gum tragcanth, 1 part. II. Gelatin, 11 parts; saccharin, 5 parts; distilled water, 24 parts.—Amer. Drug. and Pharm. Rec., 1893, 24.

Creosote Pills.—E. C. Goetting (Pharm. Rundschau, 1894, 34) states to have found, after numerous experiments, the following recipe to be excellent: To prepare 100 pills, each containing 10 centigrammes of creosote, 5 Gm. of benzoin are reduced to a fine powder in a pill-mortar (the powdered benzoin of the market being unfit for the purpose), and 10 Gm. of creosote are thoroughly triturated with the powder, until the benzoin is dissolved; to this solution are added 2.5 Gm. of finely pulverized borax and 20 drops of glycerin, and the mass is titrated with 13–15 Gm. of powdered licorice-root to form a soft pill-mass, which is at once made into 100 pills. The mass is easily rolled out. These pills leave no greasy spot when crushed on paper, do not flatten while lying, soon harden into a durably plastic consistence, and easily dissolve in water, even after having been kept for several weeks, it is claimed. The emulsification of the creosote is so complete that the pills, in being rubbed up with water, give a uniform emulsion, depositing only the licorice-root, and which may well serve as creosote emulsion.

Pills Containing Ethereal Oil.—E. C. Goetting (Ibid., 1894, 85) considers the same procedure also serviceable for pills of essential oils. For every 40 drops of ethereal oil 1.3 Gm. of benzoin is used and triturated with the oil until solution takes place. To this are added 60 centigrammes of borax powder, and 4 drops of glycerin. All this having been well mixed and rubbed up, the other ingredients of the prescription are added and worked into a pill mass with powdered licorice-root. This mass does not crumble, and permits of being easily and well rolled out. Pills each containing, for instance, 2 drops of eucalyptus oil, weigh, when made in this manner, less than 30 centigrammes apiece. They harden in a short time, without losing their plasticity, do not allow any oil to exude, and soon break up in water, even after having been kept for some length of time, it is claimed. If, in preparing such pills, the result should not be satisfactory, and if the pills should produce an oil spot on being pressed against paper, the quality of the benzoin used is probably at fault, for which reason the author recommends to employ only the white parts of the commercial benzoin, or Siam benzoin. In case neither is accessible, more of the benzoin and, relatively, also more borax should be used. The recipe is said to be serviceable also for copaiva and other balsam and oleo-resin pills; the pill-mass will be improved upon, however, by employing glycerin diluted with about an equal part of water, instead of concentrated glycerin.

Creosote Pills.—1.0 magnesia and 2.0 glycerin are triturated and 10.0 creosote gradually added; the following substances are then incorporated in the order named: 5.0 magnesia, 5.0 powdered licorice extract and q. s. (16.0–18.0) powdered licorice root; the mass is divided into 100 pills. The pills, when pressed on a piece of white paper, do not cause an oily stain; immersed in water they readily soften and disintegrate. *Tar pills*, which have recently been prescribed to some extent, can be made by the above formula, substituting 10.0 tar for the creosote.—E. Dieterich, Pharm. Centralh., 1893, 633.

Creosote Pills.—For obtaining very small creosote pills Fauël recommends the use of a mass obtained by dissolving five parts of sugar in twenty-four parts of water and then adding eleven parts of gelatin. One part of this, used warm, is said to emulsify two parts of creosote, and by the addition of liquorice powder a convenient pill-mass may be obtained which contains a large proportion of the active ingredients. When creosote is prescribed in pilular form, together with tannin and iodoform, Violé absorbs the first by means of animal charcoal, then adds the other ingredients, and finally masses the whole with turpentine. The charcoal is said to mask the taste of the creosote to some extent, and by rolling the pills in magnesia, silvering or coating with tolu varnish, it may be still further covered.—Pharm. Jour. Trans., 1894, 735.

——— A. Stern recommends the use of tolu balsam. To 50 Gm. of creosote 120 Gm. tolu balsam are used. The balsam is wetted in a water-bath and the creosote mixed therein. The mass is cooled on a plate and put in a glass stoppered bottle until ready for use.—Pharm. Post, 1894, 122.

——— The creosote should be thoroughly mixed with twice its weight of powdered liquorice root, and then adding sufficient glycerin until the desired consistency is reached. By this method a plastic mass results, in which the creosote is equally distributed.—Pharm. Post, 1893.

——— Creosote is mixed with a double proportion of powdered acacia and sufficient glycerin is added to form a plastic mass.—West. Drug., 1893, 364.

——— Pills made with magnesia do not keep well, the constituents of the creosote acting upon the magnesia, in time forming compounds which do not seem to exhibit the same medicinal action as creosote alone does. Wax makes a very good pill, but it is objectionable because it does not melt at the temperature of the stomach, and because it is digested with difficulty. Pills made with balsam of tolu have passed unchanged through the alimentary canal. Vulpius recommends the employment of powdered licorice root and glycerin, and pills made in this manner have proved very satisfactory to physicians, as have also those made with powdered marshmallow and glycerin. Another good form of administration for creosote is to distribute it in powdered marshmallow or licorice, and fill into capsules in the moist condition without massing.—Pharm. Era, 1893, 509.

Composition of Creosote Pills.—Homeyer (Apoth. Zeit.) communicates the result of his analyses of various brands of creosote pills, and objects strenuously to the admixtures frequently used by manufacturers for the purpose of rendering their pills more permanent. These additions remain unknown to apothecaries and physicians, and under certain circumstances may produce unpleasant results. Creosote pills may be manufactured readily without the addition of foreign substances, especially those which impede their analysis. Homeyer has examined two brands of pills, which are notably deficient in creosote. He cautions his colleagues to be careful to select pills which contain the proper quantity of medicament.—Bull. Pharm., 1894, 270.

Excipients for Creosote Pills.—A paper was read before Kings Co. Pharm. Soc. upon pill excipients, particularly directed toward handling creosote, and a portion of the formulas is here given:

I.

℞.	Ceræ flavæ	gr. x.
	Creosoti	gr. xxx.
	Pulv. glycyrr. rad	gr. xiv.

M. ft. pill No. xx.

II.

℞.	Creosoti	gr. xxx.
	Magnes. calc	q. s. fiat massa.

M. ft. pill No. xx.

III.

℞.	Creosoti	gr. xxx.
	Sapon. pulv	q. s. ft. massa.

M. ft. pill No. xx.

IV.

℞.	Gelatinum	11 parts.
	White Sugar	5 "
	Water	24 "

Keep this as a jelly in stock.

V.

℞.	Gelat. comp	gr. xv.
	Creosoti	gr. xxx.
	Ext. glycyrr	q. s.

M. ft. pill No. xx.

VI.

℞.	Balsami tolut	gr. lx.
	Creosoti	gr. xxx.
	Pulv. glycyrr. rad	gr. lxxx.

M. ft. pill No. xx.

VII.

℞.	Benzoin. pulv.	gr. xx.
	Aquæ	q. s.
	Creosoti	gr. xxx.
	Fiat emulsio et adde	
	Pulv. glycyrr. rad	gr. lxx.

M. ft. pill No. xx.

From these the speaker chose as best the benzoin process, saying that with gelatin they keep well and disintegrate readily in the stomach, but were difficult to make. Soap did fairly well. Calcined magnesia did not dissolve entirely, apparently owing to a chemical combination. Bread crumb, which was also tried, was a total failure as far as covering creosote was concerned; those made with tolu balsam were too large.—Amer. Drug. and Pharm. Record, 1894, 248.

Preparation of Creosote, Guaiacol, Eucalyptol, and Terpinol Pills.—Wm. Kollo (Pharm. Post, 1893, 427) prepares creosote pills as follows: The prescribed quantity of creosote is triturated in a mortar with a little water—about two drops to one Gm. of creosote. If some additional substances, as, for instance, sodium arsenate, codeine, or narcotic extracts, are prescribed, these are first triturated with the water, the creosote added with enough finely powdered extract of liquorice to make a mass of the consistence of a soft extract. Other prescribed substances, such as quinine, for instance, should only now be added, and the mass kneaded with a sufficiency of powdered liquorice-root. Terpinol, guaiacol and eucalyptol pills are prepared by the author in the following manner: Equal parts of the prescribed substances and of syrup are weighed out and triturated in the mortar. To this are added a little powdered acacia and enough powdered extract of liquorice to attain the consistence of a soft extract. The other prescribed substances are now added, and the mass is kneaded with a little magnesium carbonate and a sufficiency of powdered liquorice-root. Pills thus prepared are said to look well, to be hard, and to be easily coated. The final mass weighs 3–4 times as much as the creosote, guaiacol, etc., it contains.

Camphor and Essential Oil in Pills.—S. A. McDonnel, in compounding the following prescription, added the oil, camphor and quinine in a mortar, poured in some melted yellow wax and made-up pills:

℞.	Quin. bisulph	gr. xx.
	Camphor	gr. xx.
	Spt. vini rect	q. s.
	Ol. menth. pip	gtt. xx.

M. ft. pil., No. xxx.

—Pacific Drug., 1894, 89; West. Drug., 1894, March.

Aloes and Iron Pills.—W. F. Martin (Chem. and Drug., 1894, 210). The author said the quantity of confection of rose ordered in the Pharmacopœia to make this pill-mass was too small, and the pills could only be rolled out with difficulty. The pills also soon became hard. He had found an excipient consisting of equal parts of glycerin of tragacanth and confection of rose answered well. The proportions he found most suitable were:

Sulphate of iron	1½	parts.
Barbadoes aloes	2	“
Compound cinnamon-powder	3	“
Glycerin of tragacanth	1½	“
Confection of rose	1½	“

Nine and a half parts of the above are equal to 10½ of the official pill-mass. It therefore takes 109 gr. instead of 120 to make twenty-four pills. The pills have thus the advantage of being smaller, and they keep better than any other proportion tried.

Pilulæ Catharticæ Compositæ.—G. H. Chas. Klie lays important stress upon preparing the compound extract of colocynth and abstract of jalap, and in purchasing and selecting the other ingredients.—New Eng. Drug., 1893, 367.

Digitalin Granules, Tablets and Pills.—J. B. Nagelvoort (Drug. Bull., 1893, 108) gives the following tests:

Tests.—(*a*) Triturate to a powder in a mortar one pill, tablet, or granule, containing one one-hundredth of a grain ($\frac{1}{100}$) digitalin; transfer this to a test-tube; add two (2) C.c. absolute alcohol, and agitate for five (5) minutes; filter; divide filtrate over two (2) small-sized porcelain lids, (or small watch crystals in the absence of porcelain lids), and evaporate the alcohol at a low temperature. Add, when the lids (or the watch crystals) are dry, to No. 1, three (3) drops 90 per cent. sulphuric acid; notice color, which must be yellow at first, and which changes to a cherry-red.

To No. 2 add also three (3) drops of 90 per cent. sulphuric acid, and stir immediately into the acid with a small glass rod, of the size of a match, drawn out to a point, slightly moistened with a 30 per cent. solution of ferric chloride, so that it is scarcely yellow. The glass rod and ferric chloride must be kept ready for this reaction. Notice color, which must be purple, and is fairly permanent for over an hour.

If watch crystals are used, they are to be placed upon white paper.

(*b*) Obtain residue from an alcoholic solution of one (1) pill or tablet, as under *a*; warm it with two (2) drops glacial phosphoric acid (75°–80° C.); notice color, which must be green.

(*c*) Obtain a residue as under *b*; warm it (75° C.) with two (2) drops conc. hydrochloric acid; notice color, which must be yellowish-green.

(*d*) Obtain a residue as under *b*; add three (3) drops 90 per cent. sulphuric acid and a small drop of bromine-water; notice color, which must be reddish-purple; add two (2) drops of water to the test; notice color, which must be green. (This test requires a far greater experience in the use of reagents than tests *a*, *b*, and *c*, and may not be successful with every operator; too strong or too weak bromine-water has a great influence on the success of the reaction, while bromine is far from agreeable stuff to handle. Dragendorff uses instead of bromine-water, a 20 per cent. caustic potash solution, to which he adds sufficient bromine to render the mixture slightly yellow.)

The following reaction is not as useful for general application as is reaction *a*. Text-books employ a peculiar language in regard to this property.

Prof. E. Schmidt states, in his Ausführliches Lehrbuch d. Pharmac. Chemie (Braunschweig: Vieweg, 1890; Organic Part, p. 1315), that this reaction (*e*) is *not* obtained with digitalin of German manufacture.

Prof. Dragendorff's opinion, set forth in his Ermittelung d. Gifte (Göttingen: Vandenhoeck & Ruprecht, 1888; 3d edition, p. 305), is that this reaction is probably due to true digitalin.

Prof. Kobert writes, in his Lehrb. d. Intoxikationen (Stuttgart: Enke, 1893; p. 682): "This color-reaction is also obtained from digitoxin Schmiedeberg. . . . True digitalin has been found in the German market ever since 1892."

(*e*) Alcohol and concentrated sulphuric acid are mixed in equal volumes and "digitalin" dissolved in it [E. Schmidt says moistened with it]. The solution is "warmed" until it commences to become yellow-colored; a drop of "dilute" ferric chloride solution is now added, which gives a bluish-green color-reaction. [Dragendorff.] Neither quantities nor proportions are given. If necessary five pills or tablets may be used instead of one, containing $\frac{1}{100}$ gr. each.—See, also, Pharm. Rund., 1893, 86.

Iron Pills (*Pilulæ Ferri Carbonici*).—The Commission of the German Apothecaries' Society, for the revision of the German Pharmacopœia, recommended the following formula for the preparation of iron pills: A solution of 50 parts of ferrous sulphate in 200 parts of boiling water is filtered into a capacious bottle containing a clear solution of 35 parts of sodium carbonate in 500 parts of tepid water. The contents of the bottle having been carefully mixed, the vial is filled with hot water, loosely stoppered, and set aside. After settling, the liquid above the precipitate is removed, and the bottle is again filled with hot water; this procedure being repeated until practically no more turbidity is produced with barium-nitrate solution. The precipitate, freed from this liquid as far as possible, is mixed in a porcelain capsule with 8 parts of powdered sugar and 26 parts of purified honey, and this mixture is quickly reduced in a steam bath to the weight of 50 parts. From each 10 Gm. of this mass 100 pills are made, with the addition of pulverized althæa-root, and dusted with powdered cinnamon. Each such pill contains 0.02 per cent. of iron.

Powdered Vallet's Mass and Blaud's Mass are prepared by Gonnermann, as follows: Fresh iron carbonate is thoroughly washed, expressed, intimately mixed with 10 parts of milk sugar and 5 parts of liquorice root, and quickly evaporated to dryness on the water-bath. The triturated fine powder is mixed with sufficient liquorice root to make 40 parts (by weight). To prepare iron carbonate pills, 1 Gm. of the yellow powder is to be taken for each 10 pills, the mass to be made up "lege artis." The mixture for Blaud's pills is prepared similarly by employing dry iron sulphate and some powdered tragacanth.—Pharm. Ztg., 1893.

A Pill Mass for Potassium Permanganate, Silver Nitrate, etc.—P. Carles recommends 2 parts of kaolin, 1 part of anhydrous sodium sulphate and scant 1 part of water. When these substances are rubbed together a plastic mass will result, which will remain in soft condition for from 6 to 10 minutes. After 15 minutes the pills become so hard as to be regarded as unbreakable. Potassium permanganate, silver nitrate, gold chloride, or mercurous iodide, in the form of fine powders, may be incorporated in this mass while in plastic condition. These chemicals will not be altered in color, and will not be decomposed. If one of these hard pills is placed into a tablespoonful of water the salts will enter solution unaltered.

Should any other earthy substance be substituted for kaolin, it should be strongly incinerated so as to free it from all organic substances.—Pharm. Ztg., 1893, 324.

Preparation of Mercury Pills.—Dr. Quingnaud (Pharm. Post, 1893, 621) publishes a new practical method of preparing mercury pills. 30 Gm. of medicinal soap are dissolved in distilled water, precipitated several times with salt water, well washed out, and finally redissolved in an abundance of distilled water. To this is poured a dilute solution of 13.5 Gm. of mercuric chloride, and the resulting mercury oleate washed by malaxation. After kneading with powdered liquorice-root, 100 pills are made from the mass, each of which will contain 15 Cgm. of mercury oleate or 4 Cgm. of metallic mercury. The pills are finally coated with molten salol. When thus prepared, mercurial pills do not disturb digestion in the least, it is claimed, and are very efficient against all syphilitic symptoms.—See, also, Méd. Scient., Nov., 1893.

Oleate of Mercury Pills.—Quingnaud and Porte (La Méd. Scientif.; Nat. Drug., 1894, 41). Dissolve in a sufficient quantity of water 30 Gm. of medicinal soap, and then precipitate by the addition of salt water; decant and repeat the operation several times. Cast on a bit of oil-cloth and wash very lightly with distilled water, and finally dissolve the soapy residue in a large quantity of water. In another vessel dissolve 13 Gm. 50 Cgm. of bichloride of mercury in sufficient distilled water and mix the two solutions with constant agitation. At the end of several hours collect the precipitated oleate of mercury, wash by malaxation and preserve in parchment paper, kept carefully from the light. The pills are made with this oleate and licorice, and should be immediately coated with melted salol (see Nat. Drug., 1894, 14). Each pill should contain 15 Cgm. of the oleate, representing about 4 Cgm. of metallic mercury. Pills thus prepared are free from all the defects and bad effects of the oleate otherwise prepared, as they do not disturb the gastric functions, and are absorbed in the intestine. They are especially valuable in the treatment of syphilis and syphilitic affections.

Phosphorus Pills.—

Phosphorus	1 grain.
Suet	500 grains.

Melt the suet and phosphorus together on a water-bath, strain into a mortar and allow to cool. Another method is to mix 1 Gm. amorphous phosphorus with 50 Gm. of flour and sufficient milk curd to form a mass.

Dissolve the phosphorus in carbon bisulphide, using for every 10 Gm. phosphorus, 5 Gm. carbon bisulphide; when dissolved add 6 Gm. powdered liquorice and triturate till the carbon bisulphide is evaporated, then add sufficient water to form a pill mass, divide and coat with tolu.—Montreal Pharm. Jour., 1894, 81.

Pills of Pix Liquida.—Bolus alba is said to be an excellent excipient for pix liquida. It is said that 8 to 10 Gm. of pix liquida can readily be formed into 60 pills in this manner.—Phar. Ztg., 1893, 363.

Creosote and Tar Pills.—E. Dieterich (Pharm. Centralh., 1893, 634) recommends the following formula: 1.0 Gm. of calcined magnesia is mixed with 2.0 Gm. of glycerin and 10.0 Gm. of creosote emulsified in this mixture. To this are then added in rotation: 5.0 Gm. of calcined magnesia, 5.0 Gm. of powdered extract of liquorice, and enough (16.0 to 18.0 Gms.) of powdered liquorice root. After thoroughly mixing, the mass is formed into 100 pills, which may be rolled in powdered roasted coffee, or in a mixture of coffee and powdered cinnamon. Creosote does not exude from pills prepared in this manner on pressure, and they crumble when placed in water. On the other hand, those prepared without previous emulsification of the creosote, remain unchanged by immersion in water. The latter may may be distinguished from the former by a greasy stain imparted on pressure; the former only slightly colors the paper to a brown shade. By the use of argillaceous earth and alumina, pills of smaller size may be prepared, but they are less soluble in the stomach. Pills of tar (pix liquida) are prepared by substituting tar for creosote in the above formula.

Quinine in Pills.—Kurssteiner (Moniteur, xliv., 1423) prepares quinine in pilular form by mixing intimately ten Gm. of quinine sulphate and two each of citric acid, powdered gum and sugar of milk, then massing with syrup. The pills are first rolled in starch and afterwards in talc.—Pharm. Jour. Trans., 1894, 818.

Estimate on Pill Taking.—The Chemist and Druggist recently asked its subscribers throughout the United Kingdom to supply it with estimates of the number of pills consumed in the kingdom daily. The estimates were based upon the actual daily sales, by the correspondents, of ordinary pills, prescription pills, and pills which are patent medicines. The average of these estimates, which were received from all parts of the kingdom, shows that the extraordinary number of 5,643,961 pills is computed to be the daily consumption. This would give one pill per week to every man, woman and child in the kingdom; and a little calculation shows that, taking the average pill to weigh three grains, a year's supply for the United Kingdom would weigh not less than 178 tons, or sufficient to fill thirty-six ordinary railway wagons, thus making a train-load requiring two powerful engines to pull it.—Drug. Circ., 1894, 163.

PYROXYLINUM.

Pyroxylin.—W. D. Field finds that by nitrating flax at a higher temperature than the cotton, it will yield a pyroxylin giving an equally fluid collodion. The presence of chlorine in the fibre results in the production of an acid pyroxylin which cannot be neutralized by washing, and the absence of moisture, previous to nitration, is essential to the production of a carefully prepared pyroxylin.—Jour. Amer. Chem. Soc., xv., 140.

RESINA.

Resin Podophyllin.—E. D. Gravill and C. E. Sage examined eight different samples with the following results:

	Insol. Matter.	Ash.
1	52.75	11.80
2	20.70	6.00
3	——	0.20
4	——	0.30
5	3.80	0.95
6	Traces.	0.20
7	"	0.50
8	"	0.50

The conclusions to be drawn from these results are: that trade samples of so-called podophyllin resin exist which are largely adulterated, and that the nature of the adulteration appears to be powdered podophyllum rhizoma and earthy matters. That the color of the resin is not a very material characteristic of its genuineness, and that samples yielding more than a trace of matter insoluble in rectified spirit, and much more than 0.50 per cent. of inorganic matter, on incineration, may be considered to be to a greater or less extent adulterated.—Pharm. Jour. Trans., 1893, 421.

Podophyllin in Toxicological Examinations.—H. Endemann, in the course of a toxicological examination of a stomach containing podophyllin obtained reactions for an alkaloid, which on drying emitted a peculiar opium-like odor. Subsequent analysis of the American podophyllin showed an oily alkaloid, which with molybdenum sulphuric acid gave a dark violet, and finally, on standing; a dark-green solution. Vanadium sulphuric acid: violet solution, gradually light green. It appears to be oxyacanthin. The author in continuing the work on the root did not obtain a liquid alkaloid, nor did it give an odor of opium on treatment with acids. He concludes that the *podophyllin* previously examined must have been adulterated with a foreign substance.—Pharm. Rund., 1893, 289; 1894, 19.

Resin of Podophyllum.—Geo. M. Beringer corrects the errors in the statement of the action of this resin toward solvents, that have been incorporated in the Pharmacopœia of 1890. He prepared a fresh sample of resin in accordance with the official directions and obtained 3.9 per cent. It exhibited the following solubilities: Ether (U. S. P., 1890) extracted 82 per cent. Chloroform extracted 70 per cent. Alcohol, methyl alcohol, and amyl alcohol readily dissolve it. Solutions of the caustic alkalies dissolve it with but a slight residue. Acetic acid, U. S. P., dissolves it but partly, but the glacial acetic acid readily dissolves it entirely. Carbon disulphide partly dissolves it Benzin and benzol each dissolve but a minute trace, about one-half of one per cent., mostly yellow coloring matter. It is insoluble in turpentine. Boiling water takes up about 22 per cent., and deposits most of this again on cooling.

The author cites the results of different investigations on the solubility of the resin in ether and water. With regard to the procedure of determining the solubility in water, the author treated one Gm. of resin with 100 C.c. of boiling water for ten minutes, the water being then decanted from the fused resin and evaporated. The residue weighed .227 Gm. A second determination yielded .230 Gm. These results are so close as to be comparable and prove their substantial accuracy, and it is believed they represent the true solubility of resin of podophyllum in water.

Another discrepancy appears in the solvent action of chloroform, as stated by Mr. F. B. Power (Amer. Jour. Pharm., 1874, 231), where 5 Gm. of resin is stated to yield to chloroform only 0.02 Gm. This is most likely an error, as immediately beneath on the same page the writer states that 2 Gm. of the ether-soluble resin yielded to chloroform 1.4. This would amount to nearly 65 per cent. of the resin, coinciding fairly well with Beringer's results, 70 per cent. The solubility in chloroform of the medicinally active constituents of the resin has likewise been taken advantage of in the process of assay generally proposed.—Amer. Jour. Pharm., 1894, 11.

Resin of Podophyllum.—J. B. Nagelvoort gives the solubility of five samples, none of which were over two years old:

Samples.	Solubility in Absolute Ether.	Solubility in Boiling Water.	Solubility in Alcohol, 90 per cent.	Solution in KOH and Acids.	Color of Samples.	Reaction of Fe_2Cl_6 in Watery Solution.	Moisture.
	Per Cent.	Per Cent.					Per Cent.
I	81.4	26.4	The Pharmacopœia requiring in all proportions, any deviating experience would give rise to a fruitless controversy.	Pharmacopœia prescribes no proportions.	Differed largely from Pharmacopœia, varying from dark green to yellow-green.	Agreed with U. S. P., but this does not prove much.	—
II	80.4	24.8					—
III	88.8	28.1					3.6
IV	77.8	26.0					—
V	80.0	23.7					—

—Amer. Jour. Pharm., 1894, 278.

Resin of Pure Jalap.—A. Kromer. Convolvulin was prepared from authentic jalap resin by first removing water-soluble constituents; after drying at a moderate temperature it was treated with several portions of ether to remove fats and other soluble matter; the brown residue, insoluble in ether, was dissolved in alcohol, and subacetate of lead solution added until precipitation ceased; the supernatant liquid and precipitate was transferred to a filter, the precipitate washed with alcohol until the washings ceased to produce a turbidity when dropped into water, and the excess of lead precipitated with H_2S, the precipitate being washed with alcohol. The alcohol was in large part recovered from the filtrate and washings, the residual convolvulin was purified by repeated solution in alcohol and precipitation with ether; it formed a coloress amorphous mass, reducible to a white powder, which, during the operation, became strongly electrified; easily soluble in alcohol and glacial acetic acid, insoluble in petroleum ether and ether; concentrated sulphuric acid colors it red or brownish red. Convolvulin is lævogyre, and has the formula $C_{61}H_{108}O_{27}$, which is deduced from its analysis and its decomposition products; alkalies decompose it into one molecule volatile methyl-ethyl-acetic acid $C_5H_{10}O_2$, and two molecules monobasic convolvulinic acid $C_{28}H_{52}O_{14}$, which is amorphous, yielding a white, hygroscopic powder soluble in water and alcohol, insoluble in ether; strong H_2SO_4 colors it red or brown-red; by the action of acids one molecule convolvulinic acid yields two molecules of a glucose and one molecule convolvulinolic acid $C_{16}H_{30}O_3$, which is insoluble in water, melts at 46° C., is not colored by H_2SO_4, and is isomeric with jalapinolic acid and scammonolic acid, both of which melt at 63–64° C.

Convolvulin in its decomposition by KOH unites with 13.7 per cent. KOH. This determination may prove of considerable value as a rapid means of determining the purity of the convolvulaceæ resins, and is performed as follows: The convolvulin or resin is dissolved in an excess of N/5 potassium hydrate, allowed to stand twenty-four hours and titrated with $\frac{n}{5}$ sulphuric acid, using litmus as the indicator. Convolvulin is slowly decomposed by mineral acids, yielding a glucose, methyl-ethyl-acetic acid, and convolvulinolic acid. Convolvulinol, one of the decomposition products obtained by Mayer in the hydrolysis of convolvulinic acid could not be isolated. It is considered to have been impure convolvulinic acid.—Pharm. Ztsch. f. Russl., 1894, Nos. 1–7.

Commercial Jalap and Jalapin.—C. E. Robinson examined 10 samples of jalap obtained from retail shops, as follows: All the samples were treated in the same manner, being extracted with spirit by continuous percolation in an extracting apparatus, the spirit evaporated, and the remaining resin washed in water, to get rid of saccharine and coloring matter, dried and weighed.

The resins were afterwards treated with ether until exhausted, and the residues again dried and weighed to ascertain the amount soluble in ether.

Sample.	Percentage of resin.	Portion of resin soluble in ether.
A	7.57	27.16 per cent.
B	12.16	9.42 "
C	16.90	8.33 "
D	12.07	11.35 "
E	9.91	11.55 "
F	11.82	16.46 "
G	10.20	17.73 "
H	17.70	9.00 "
I	12.19	22.96 "
J	9.87	20.06 "

The author has estimated five samples of "jalapin," and the results show that they have all been obtained from true jalap, Ipomœa purga. They were first dried at 100° C. for an hour and then treated with ether until exhausted of ether-soluble resin, and again dried until the weight remained constant, and then weighed:

Sample.	Moisture.	Soluble in ether.	Insol. in ether and sol. in alcohol.	Insol. in ether and in alcohol.
1	6.29 p. c.	4.63 p. c.	89.08 p. c.	none.
2	6.64 p. c.	4.22 p. c.	89.14 p. c.	none.
3	6.33 p. c.	3.79 p. c.	89.88 p. c.	none.
4	6.84 p. c.	5.67 p. c.	87.49 p. c.	none.
5	6.08 p. c.	5.80 p. c.	88.12 p. c.	none.

In reference to the names jalapin ($C_{34}H_{56}O_{16}$) and convolvulin ($C_{31}H_{50}O_{16}$) which are used, with different meaning, by English and foreign writers, and thus cause so much confusion to students and others: Convolvulin (according to Mayer) is the resin of jalap which is not soluble in ether, and forms by far the greater part (90 per cent.) of jalap resin, B. P.; while jalapin is that which is soluble in ether and only constitutes a small portion (10 per cent.) of jalap resin, and is identical with scammonin obtained from scammony root.

In England these names are often applied in an exactly contrary sense, and these names are retained because of the confusion which would arise if they were now altered. Knowing that there is this discrepancy, would it not be better to alter the nomenclature so as to agree with that in general use on the continent and in America? Although the confusion that would arise would doubtless be great at first, it is a question whether it would not be better to face that confusion and get it over, than to remain in the state of confusion which at present exists.—Pharm. Jour. Trans., 1893, 531.

Iodine Figure of Rosin.—P. C. McIlhiney. From the author's results it would appear that the average iodine absorption in eighteen hours, by different qualities of rosin, is 155.5, the average quantity of rosin used being 0.3073 Gm. and the average excess of iodine equivalent to 13.88 C.c $\frac{n}{10}$ thiosulphate. The darker samples of rosin absorb less iodine than the lighter ones, which have been subjected to less heat. The variations due to different lengths of time and different amounts of iodine in excess are, however, so serious that comparatively little can be learned by Hübl's process as to the nature of an oil when rosin is present in any considerable quantity.—Drug. Circ., 1894, 64; from Jour. Amer. Chem. Soc., 1893.

Purification of Rosin—Enumeration of Methods.—Seemingly the best process consists of first filtering to separate insoluble matters and dirt, then heating to about 150° C., with 5 per cent. of zinc chloride for an hour or two, and then adding 12 per cent. of dichromate in the form of a powder. After sufficient heating, the mass is allowed to cool down to 100° C., and is filtered. Mention is made of purification by anhydrous sulphuric acid with heat under pressure, in a sheet-iron cauldron, which can be heated by superheated steam, and fitted with a cover capable of resisting a pressure of 5 kilos. to the cubic centimeter. In this 100 kilos. of the resin to be purified are placed, heated to fusion, the pressure raised to 4 kilos., and the sulphuric acid added. The whole is heated to 100° C. for an hour, when it is left to cool, and washed with boiling water. The sulphuric acid process and the zinc chloride process are often worked in conjunction with each other.—Pharm. Era, 1894, 351.

New Rosin Standards in the U. S.—The Inspection Com. of the Savannah Board of Trade has recently adopted several amendments to the rules regarding rosin inspection. It is required that all samples shall be at least seven-eighths of an inch square, and taken from at least 6 inches below the surface of the rosin, and the grading must be made to conform to the standard approved by the Board. The standard samples are marked "Approved by the Savannah Board of Trade," and are kept constantly on hand in the exchange room at Savannah. The inspectors are required to sample at the bottom, head or side of the barrel, of at least 5 per cent. of every mark of rosin grading K, or better quality, and should false packing be discovered, they must examine the entire lot of false packing, and the expense of this examination must be paid by the seller of the rosin. Every mixed packed barrel will be marked with both highest and lowest grade, and both samples exhibited. This rosin will then be sold on its merits without any reference to either grade, but if there is no special agreement made the settlement will be made at the price of the lowest grade.—Chem. and Drug., 1894, 790.

Resin of Scammony.—A discussion upon the composition by H. Spirgates in Arch. de Pharm., 1894, 241.

SAPO.

Manufacture of Soap.—History of.—A brief resumé.—Amer. Soap Jour.; West. Drug., 1894, 176.

Manufacture of Soap Powders.—Screib states that these powders may be prepared in either of the following ways:

1. Anhydrous sodium carbonate or soda-ash is added to a "clear-boiled" soap-paste, and after thoroughly mixing, the somewhat stiff material is drawn off into cooling frames. The cold and hard soap thus obtained is then finely ground.

2. Soda-crystals and soap are melted together and then treated in the above manner. This method of manufacture, however, is only advantageous where soap-scraps are to be had.

A suitable apparatus consists of a wrought-iron vessel with a strong agitator contained in an interior cast-iron vessel, which can be cooled by water circulated in the outer vessel. The liquid soap is cooled, whilst the soda-ash is slowly added and completely dissolved. During the grinding process care has to be taken not to overheat and thus soften the product.

The composition of soap powders varies considerably. Only a small proportion of resin soap can be used, as such soap is sticky and cannot be powdered. Olein soap may be used with advantage, and the olein may be saponified with sodium carbonate, instead of the more expensive caustic lyes.

As a small quantity of free chlorine is not objectionable in soap powder, dark-colored materials such as bone-fat, fish-oils, &c., may be used for making the soap, with an addition of a small quantity of bleaching powder. To some soap powders 2 to 5 per cent. of sodium silicate is added. A good washing powder should contain 30–35 per cent. of fatty acid; 30–35 per cent. of sodium carbonate, and 30–40 per cent. of water. The inferior powders containing only 5–10 per cent. of fatty acid should not be used for the laundry; they are only serviceable for scrubbing purposes.

There is a soap powder in the market containing a soap prepared by treating linseed with caustic soda directly. This soap contains certain impurities derived from the seed, which lather freely, and thus when the powder is used, give the impression of more genuine soap being contained in the powder than is actually the case.—Chem. and Drug., 1893, 487; from Jour. Soc. Chem. Ind., 1893.

Superfatted Soaps.—J. R. Johnson suggests the use of calomel as a test for neutrality.—Pharm. Jour. Trans., 1894, 1045.

Toilet Soaps—A Critique of.—H. Helbing and F. W. Passmore examined English toilet soaps, with the following results:

	Water per cent.	Alkali.		Fat.				Relative Softening Value.	Injurious Ingredients.
		Free (Na_2CO_3)	Total (Na_2O)	Per cent.	Melting Point.	Odor.	Superfat.		
		(parts per 100,000).	(per cent.)						
1.	8.02	8	7.32	83.6	41–43.5° C.	Sweet.	Lanolin.	100	—
2.	6.64	310	7.76	85.14	42–43.5° C.	Sweet.	Petroleum and a trace of Lanolin.	89.6	—
3.	15.77	900	9.14	74.24	36.44° C.	Turpentine-like.	Terpenes.	77.5	—
4.	24.35	2,010	7.53	67.18	37–40.5° C.	Sweet.	Petroleum.	71.8	Tropæolin.
5.	5.95	260	7.80	85.30	39–43° C.	Sweet.	Glycerin Fat.	89.6	—
6.	23.02	1,980	7.83	67.02	34–37.5° C.	Sweet.	None.	69.0	Resin.
7.	6.6	400	8.06	86.76	37–40° C.	Sweet.	Glycerin Fat.	84.1	0.4 per cent. Vermilion. (sulphide of mercury).
8.	6.51	250	7.32	85.10	40–43° C.	Rancid.	Glycerin Fat.	88.5	Rancid fatty acids.
9.	8.91	680	8.35	82.66	37–39° C.	Sweet.	Trace of Lanolin.	79.3	—
10.	6.55	370	7.94	84.22	36–39° C.	Sweet.	Glycerin Fat.	93.2	Eosin.

—Helbing's Pharm. Rec., 1893, July 29.

A Point in the Analysis of Soap.—It is pointed out by E. Dieterich in a recent contribution to the study of soap, that a partial dissociation takes place of the alkali salts in soap during the salting-out process, and that by repeating the operation several times the amount of free fatty acid in the sample is unduly raised. This occurs, he states, whether the salting-out be performed in hot or in dilute solutions. For these reasons he has abandoned the salting-out process in his own work when estimating the total alkali in soap, and has adopted in its place the following modification of the well-known process of Geissler: One Gm. of the sample soap is dissolved in 30 C.c. of 96 per cent. alcohol, and 5 C.c. of decinormal sulphuric acid is added, the mixtures being then boiled until carbonic acid gas ceases to be evolved. The cooled solution is then titrated with decinormal alkali, using phenolphthalein as the indicator.—Helfenberger Annalen, 1892; Chem. Zeit. (Rep.), 1893, 206.

Estimation of Silicates in Soap.—This may be accomplished, according to Seifenfabr. by adding either sulphuric or hydrochloric acid to an aqueous solution of the soap. The silicate or water-glass will precipitate as a gelatinous mass, above which float the lighter fatty acids. The precipitate is to be collected on a filter, washed, dried, incinerated, and finally weighed. For the complete decomposition of 10 Gm. of soap, about 25 C.c. of sulphuric acid, or about 45 C.c. of hydrochloric acid will be required. The acid should, of course, not be used in the concentrated form, but diluted with seven to ten parts of water.—West. Drug., 1894, 364.

Calomel Soap is recommended by Watrazewski as possessing many advantages over mercurial ointments. It is prepared by blending the fumes of calomel with potash soap in the proportion of one to two or one to three. Two to three grammes should be used daily.—Rev. des Sciences Med. and Journ. de Pharm., xxix., 77.

A New Medicinal Soap.—Patented specifications are: Take 12 ounces of pure (etching lye of soda) tallow soap, containing at most 12 per cent. of water, and place the same in a vitreous earthen vessel, then place in the same vessel with the tallow soap 9 fluidounces of white wine, then dissolve the tallow soap in the wine, by applying thereto a gentle heat until it becomes of the consistency of a thick pap, taking care to stir the ingredients named during the application of heat, then add 3⅓ fluidounces of olive oil, continuing the application of heat, and taking special care that the contents of the vessel do not boil, until the same becomes of the consistency of a thin pap; whereupon discontinue the use of heat, and allow the mass to cool sufficiently that it will not burn the finger when placed therein. Then dissolve ¾ ounce of camphor in ¾ ounce of olive oil, ¼ ounce of oil of rosemary, and ½ ounce of oil of lavender, and add the resultant solution to the mass aforenamed. For this process it is claimed that the dissolving of tallow soap in white wine, and then adding olive oil—that is, not allowing the olive oil to be saponified—is an entirely new feature. The olive oil, when not saponified, will, in combination with the white wine, give an effective vehicle for spreading the particles of camphor over the skin, at the same time covering it with a layer of oil.—West. Drug., 1894, 98.

Mercurial Soap.—Andry (Rev. enter. de Bibliog.) makes this soap as follows:

Liquor potassæ	100 parts.
Liquor sodæ	40 "
Oil of sweet almond	300 "

Unite the liquors and add the mixture little by little to the oil, agitating after each addition. Put the mixture in a water-bath, raise to a temperature of 90° to 100° C., and keep it there for three or four hours, agitating frequently. Pour into a large mortar and expose to the air at a temperature of from 20° to 25° C. Gradually the pomade assumes the consistency of lard. Into this soap incorporate the desired quantity of calomel, thus:

Soft soap, as above	100 parts.
Calomel	60 "
Oil of sweet almond	20 "

Mix and incorporate.

Experiment shows that frictions with this preparation are rapidly absorbed, and that it answers as well as the ointment made with Neapolitan Unguent of the Codex. It is readily washed off from the hands and implements with plain water, which is one great advantage.—Nat. Drug., 1894, 176.

Quillaja Soap.—A process for preparing soap containing quillaja has been patented in Germany. The bark is macerated with distilled water, and the residue treated with boiling water under steam pressure, the residue remaining after this operation is subjected to distillation with high pressure steam. The mixture of the fluids obtained by these three operations is then concentrated by evaporation, the resin contained in the extract saponified with potash or soda, and the quillaja preparation thus obtained mixed with pure potash or soda soap. The soap serves for cleaning very fine stuffs, it being claimed not to attack the most delicate colors.—West. Drug., 1894, 181.

Sulphur Soap.—According to a German patent, sulphur is chemically combined in a soap by heating 100 parts of oleic acid with 12 parts of sulphur at a temperature of 160° C., whereby the sulphur is dissolved and will not separate on cooling. The sodium salt is made from this product by either adding, with proper precautions for cooling, 60 parts soda lye (containing 25 per cent. sodium hydrate) and then separating the excess of lye by pressing the doughy mass, or by dissolving the sulphur compound in 200 parts of 90 per cent. alcohol, saponifying with 43 parts of soda lye (containing 35 per cent. caustic soda) and evaporating to dryness on a water-bath.—Ibid., 1893, 402.

Thiosapol Preparations are soaps containing sulphur in chemical combination. Thiosapol cocoa-nut oil soap (containing about five per cent. sulphur) is made by heating 1 Kgm. linseed oil with 166 Gm. sulphur to 120–160° C., until solution is effected and no separation of sulphur occurs on cooling; one Kgm. of this product is melted with one Kgm. cocoa-nut oil, and when cooled to 25° C., is incorporated with one Kgm. of solution of soda (35 per cent.) and allowed to stand until complete saponification takes place. Thiosapol-sodium, containing 10 per cent. sulphur, can be made by heating one Kgm. oleic acid and 120 Gm. sulphur; the resulting product is then thoroughly mixed with 600 Gm. solution of soda (25 per cent.) and the excess of liquid later removed by expression; the sulphurated oleic acid may also be dissolved in two Kgm. 90 per cent. alcohol, saponified by the addition of 430 Gm. solution of soda (35 per cent.) and the filtrate evaporated to dryness on a water-bath at 50° C.—Pharm. Ztg., 1893, 663.

SPIRITUS.

Denatured Spirits.—A regulation was recently passed by the French Excise, ordering that in future alcohol should be denatured when methylated, by the addition of 500 C.c. of benzin and 1 gram of malachite green per hectolitre. The color so produced is not deep, but yet sufficiently so to interfere with its useful employment in several processes (celluloid treatment, certain varnishes, etc.). The following simple method of decolorizing it has, therefore, been devised: A few drops of concentrated solution of hypochlorite of lime is added gradually to the alcohol until just decolorized. By careful manipulation no excess of the hypochlorite is used, and as the coloring matter is completely destroyed by the available chlorine, it can never be destroyed, and simple neutral salts of calcium are left, and these in such small amount as to be negligible.—Rép. de Pharm., 1893, 420.

Spts. Ammoniæ Arom.—Research in cases of precipitation, the conditions under which it may be avoided, and a method of assay of this preparation. The author concludes that the precipitate may be avoided by lessening the strength of alcohol or the amount of carbonate. The author employed a number of methods of assay, and obtained the most satisfactory results with Allen's process for the estimation of NO gas. The author does not consider this practical, however. Results of assay of preparations are appended.—New Eng. Drug., 1894, 139.

Source of Bay Rum.—According to the Bull. of Jamaica Bot. Dept., bay rum in Dominica is manufactured from the dried leaves of Pimenta acis, W. & A. Bay rum is procured by distillation, and this in a very simple manner. The leaves are picked from the trees and then dried; in this state they are placed in the retort, which is then filled with water, and the process of distillation is carried on. The vapor is then condensed in the usual way, and forms what is known as "bay oil." The manufacture is carried on at the northern end of Dominica, and proves a very lucrative business to those engaged in it, as the plants are plentiful in this district.—West. Drug., 1894, 222.

Camphor Spirit—Estimation of.—Holdermann (Apoth. Ztg., 1893, 306) utilizes a well-known optical property of camphor—that of rotating the plane of polarization to the right. With spirit of camphor Ph.G. (10 per. cent.), this takes place through an angle of +10° (9.6°). If an equal weight of dilute alcohol (0.892 to 0.896) be added to the spirit, the liquid will produce a rotating angle of +5°. Thus each degree of dextrogyration corresponds to one per cent. by weight of camphor.

Essence of Pepsin.—S. Mühl (Chem. and Drug., Sept. 1893, 3).

Glycerole of pepsin	3	parts.
Sherry	5	"
Glycerin	1	"
Simple elixir to make	16	"

This makes an essence the exact counterpart of a very popular preparation.

Spirit of Soap.—O. Wentzky.—600 Gm. olive oil, 700 Gm. potassium hydrate solution (1.144 to 1.146 sp. gr.), and 750 Gm. alcohol, are mixed in a flask and shaken from time to time. In two days the saponification is complete. Then 2250 Gm. alcohol with 40 Gm. sodium bicarbonate are added. Allow to stand one day. Filtered and mixed with 1700 Gm. water.—Pharm. Zeit., 1893, 654.

——— C. Arrato (Pharm. Zeit., 1893, No. 38) proposes the following: 12 parts of olive oil are heated with 14 parts of potassa solution (sp. gr. 1.130) on the steam-bath in a long-necked flask for 10-12 minutes. 5 parts of alcohol (sp. gr. 0.832) are then added, in two or three portions at intervals of one minute. The bottle on the steam-bath is almost constantly agitated, leaving it on the bath each time only a few seconds; saponification having taken place after about 5 minutes, the remainder of the prescribed quantity of alcohol and water is added.—O. Wentzky (ibid.) saponifies in the cold way. He puts 60 parts of olive oil, 70 of potassa solution (sp. gr. 1.144–1.146), and 75 of alcohol (sp. gr 0.832) into a bottle, and vigorously agitates it from time to time. Saponification will be complete in 2 days. A filtered sample is clearly miscible with water and with alcohol. He then adds 225 parts of alcohol and 4 of sodium bicarbonate, shakes repeatedly and sets it aside for a day. The fluid is now filtered, and the soap spirit completed by the addition of 170 parts of water.

Spiritus Tamarindi.—330 Gm. pulpa tamarindi depurat. (Ph. G., III.) and 50 Gm. fol. sennæ alex. spiritu vini extracta are infused with 2000 Gm. boiling water for 12 hours—the filtrate after two extractions to weigh 700 Gm. 525 Gm. of this solution is nearly neutralized with liq. sodæ (90 Gm.), and mixed with 100 Gm. alcohol, 100 Gm. syr. simplex, 5 Gm. tr. vanillæ, and then the remaining 175 Gm. added. The liquid is allowed to stand from 6 to 8 days, and then filtered.—Apoth. Soc. Berlin; Pharm. Rund., 1893, 186.

SUCCUS.

Preparation of Raspberry Juice.—The fresh, crushed fruit is placed into the lightly covered clay vessel at a temperature not exceeding 20°–25° C., and stirred with a wood spatula several times daily. After 4–5 days (when alcoholic fermentation has terminated) the mass is strained and the residue expressed. The completion of the process of fermentation is determined by the following tests: 2 parts of the filtered fluid must remain clear on being mixed with 1 part of concentrated alcohol; and the filtered juice must remain clear also when mixed with a concentrated aqueous solution of magnesium sulphate. The strained fluid is now boiled, put aside for a day or two, cautiously decanted from the sediment, and finally filtered. If the juice is to be kept for some length of time, it is collected in larger glass containers and exposed in a steam bath to a temperature of 80–90° C. The stoppers and necks of bottles are covered with pitch or a mixture of paraffin and wax. In some localities the finished product is impregnated with carbonic acid under a pressure of 2 atmospheres. Some believe that raspberry juice can best be preserved by adding 10 per cent. of alcohol.—J. Orient, in Pharm. Post, 1893, 408.

Filtration of Raspberry Juice.—G. Arends employs 3 filtering cloths and pulp filter paper, and siphons from one to the other. In one day from 100 to 150 Kg. of juice may be filtered.—Pharm. Zeit., 1893, 502.

Composition of Orange Juice.—Analysis by Pickell and Earle shows the following composition: Dry matter, 122.9; nitrogen, 0.124; organic matter, 11.24; silica, 0.010; sulphur trioxide, 0.042; phosphorus pentoxide, 0.077; iron sesquioxide, 0.006; lime, 0.207; magnesia, 0.045; potash, 0.479; soda, 0.039; chlorine, 0.011. The rest may be taken as water, and the sugar, acids, etc., come under the heading of organic matter. It is stated that different oranges of the same species differ sometimes very considerably as regards the ash constituents, the difference being due to variations in soil and climate.—Drug. Circ., 1893, 274.

SUPPOSITORIES.

Suppositories—Glycerin.—F. L. Decker. For suppositories containing 90 per cent. of glycerin, the formula in Remington's "Theory and Practice of Pharmacy" answers well. For 95 per cent. suppositories the following: glycerin, 47.500; stearic acid, 1.250; dried carb. soda, 1.250. For 98 per cent. suppositories: glycerin, 49.000; stearic acid, .600; dried carb. soda, .400. The formula in the B. P. the writer does not think practical on account of the amount of gelatin they contain, which makes them sticky and hard to dissolve.

——— *Assay.*—Several methods were devised, but none were satisfactory. The bases of the suppositories of commerce examined were stearates. —Pharm. Jour. Trans., 1893, 63; from New Eng. Drug.

Suppositories of Glycerin.—E. C. Angel uses sodium hydrate to prevent premature solidification and also to cause disappearance of the frothy curd noticed when carbonate is used. As a coating, the writer uses waxed paper in preference to collodion.—Pharm. Jour. Trans., 1893, 100.

——— D. Bon (Gior. farm. Trentino, vii., No. 5).

Glycerin	10 Gm.
Water	5 "
Gelatin	1 "

Melt by a gentle heat and pour into molds. When cold dip into a mixture of melted cacao butter and white wax.

Making and Coating Glycerin Suppositories.—C. S. Boudurant (Amer. Drug. and Pharm. Rec., 1894, 91):

Sodium carbonate crystal	1 part.
Stearic acid (dry)	2 parts.
Glycerin	32 "

Powder sodium carbonate and stearic acid finely, mix with the glycerin in evaporating dish, place on a water-bath, and continue heat until effervescence ceases and complete solution is effected. Pour into cold, dry molds, and when congealed, cut off, and insert into one end a long needle; dip quickly into melted paraffin for an instant, cool quickly, take out the needle, stop the hole by gentle pressure, keep in glass-stoppered bottles.

Medicated Glycerin Suppositories.—Kohlstock has had good results from the combination of glycerin suppositories with purgatives, such as aloin, colocynthin and citrullin (colocynthidin), the amounts used per dose being respectively 0.5 Gm., 0.03 Gm., and 0.02 Gm. There was no irritation induced; on the contrary, the action was agreeable, pain being seldom felt; no inclination to constipation was ever left through their use.—West. Drug., 1894, 141.

Suppositories —Salol.—H. Barnouvin melts the cocoa butter with the least possible amount of heat and stirs in the salol, or prefers to make a paste of the former in a mortar, and then incorporates the salol.—Rép. de Pharm., v., 387; Jour. Pharm. Chim., 1893, 362.

Suppository Machine.—Each machine is furnished with a set of molds for making suppositories of three sizes—15-grain, 30-grain and vaginal—and with mold for forming bougies. These molds are of brass and are screwed into the end of the cylinder. They can be easily and rapidly inserted or removed.

In making suppositories the cacao butter containing the medicant is placed in the cylinder, the mold required being first attached; the cylinder is put in position with the end of the mold resting aginst the movable plate at the end of the machine. The mass is then compressed in the forms by turning the wheel and screwing the plunger into the cylinder. After forming the suppositories the end plate is removed, and a further turn of the wheel forces them out upon the tray. The operation is then repeated until all the mass has been used. By a special device the screw on the plunger rod may be released so that the plunger may be pushed into the cylinder or withdrawn from it without the slow process of screwing.—Amer. Drug. and Pharm. Rec., 1893, 345.

Suppositories, Ovules, Bougies and Intra-Uterine Crayons.—V. J. Pequart offers the following for *Ovules and Suppositories:*

White gelatin, best	30 parts.
Distilled water	45 parts.

Leave in contact for two or three hours, and then add,

Pure glycerin (30°)	165 parts.

The medicament should be added to the glycerin before mixing. If it is insoluble in that medium, it must be pulverized as finely as possible and suspended in it.

Melt in a water-bath, and agitate to secure homogeneity. As soon as this is effected, let the mixture cool down to about half the original temperature, and then pour into moulds. This cooling is the more essential in those cases in which the remedy is merely suspended in the vehicle. The use of the water-bath is essential, from the fact that gelatin once superheated refuses to solidify. Preserve the product in lycopodium.

The preparation of bougies in which an active remedial agent is contained (*bougies porte-remède*) comprehends two operations, viz: The preparation of the inert core, and the preparation of the active mass to cover the same.

Preparation of the Inert Core Mass.—Take of

Best white gelatin	20	parts.
Distilled water	10	"
Glycerin, pure	30	"

Let the gelatin and water remain in contact as before, add the glycerin and melt together in the water-bath. When homogeneous pour out on a shallow tin tray, or on a perfectly flat sheet of tin slightly turned up around the edges (1/16 inch is sufficient), which has been well warmed, as this insures a sheet of gelatin of even thickness. The sheet should be about 1/16 inch (1.5 Mm.) in thickness.

When quite cold and solid, with a knife and straight-edge cut the plaque into strips 1/16 inch wide and 6 inches long, put them in a dry, cool place and leave them for several days to dry out, and thus lose a part of their elasticity.

Preparation of the active mass. Take of

Pulverized gum acacia.	5	parts.
Milk sugar	20	"
Honey	1	part.
Glycerin, pure	1¼	"

The active substance, the quantity prescribed.

If necessary, add sufficient water (never more than a few drops) to give a proper consistence. Mix and make a mass. Roll out this mass on a slab well dusted with lycopodium, as you would in making pastelles, to about the thickness of parchment paper. Then with the knife and straight-edge, divide the thin leaf into the same number of strips as you have core-rods, making each strip 6¾ inches long. If you have carefully measured the thickness of the sheet, each strip will be about 4/10 inch wide.

When your strips are ready, place a core-rod on each one, and roll it up so that ¾ inch of the envelope will remain at one end. This serves as a means for properly pointing and rounding the bougie into an olive-shaped mass of active ingredient. In order that the core and envelope shall adhere properly to each other, it is necessary to wipe the lycopodium off the core and the envelope with a damp sponge passed over each at the moment of rolling. After the bougie is finished, roll it in lycopodium again.

Intra-Uterine Crayons.

Make a pill-mass with the following ingredients:

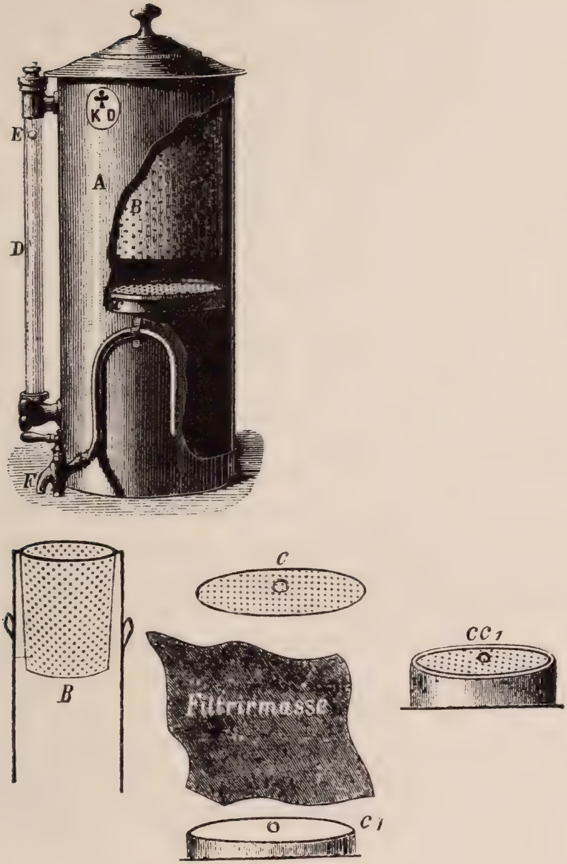
Pulverized acacia	5	parts.
Milk sugar	20	"
Honey	1	part.
Glycerin, pure	1½	"
Active ingredient, as prescribed.		

Roll into crayons about 1/12 inch in diameter, and from 2½ to 3 inches long. Let dry for a day or two, and then plunge each crayon into the inert mass directed for ovules and suppositories (first formula above), heated so as to be sufficiently fluid for the purpose. Withdraw at once, let cool off, and preserve in glass tubes hermetically sealed at each end with plugs of paraffin. The tubes should be thoroughly dried before putting the crayons in them.—Jour. Pharm. Chim., 1894, 377.

SYRUPI.

Preparation of Simple Syrup.—The Saccharolyser (Fig. 35) of G. Dethan consists of 2 cylinders, *A* and *B*. To the inner sides of the outer cylinder (*A*) is fastened a perforated filtering vessel consisting of two parts, *C* and *C 1*, between which is placed the filtering medium, called by the firm "Fleur de peupliers de Norvèges." Above this the second cylinder (*B*), which is about half the size of *A*, is suspended. This is made of perforated tin plate and is so arranged with reference to *A*, that there is sufficient room between the two vessels. Upon the outside of the cylinder *A* is a glass tube *D* with a density ball *E*, and to the under side of the tube, more to the side, is a stop-cock which is connected to the apparatus by means of a bent tube, while upon the opposite side is an air-tube which is needed under the filtering cylinder. The perforated cylinder is filled with loaf sugar, to which some water is then added. In a short time the sugar dissolves, the syrup penetrates through the filter, thence into the clear space below, and when it has obtained the proper density, 35°, it forces the glass ball upward in *D*, and the latter is gradually filled. The height of the ball represents the height of syrup in the apparatus. The resultant syrup is clear, free from glucose, and is always of the same density; the operation is continuous, and there is no evaporation.—Pharm. Post, 1894, 65; Jour. de. Pharm. von Elsass. Loth., xxi., 118.

FIG. 35.



Preparation of Simple Syrup.

Water in Syrups—Determination of.—A. Josse.—White filter paper is cut into strips of 1–2 Cm. wide to a total length of about 3 M. A spiral is formed out of these strips after they have been previously folded so that the windings of the spiral do not adhere to one another. This spiral is then placed in a metallic capsule 2 Cm. high and about 7 Cm. in diameter, provided with a tightly-fitting cover. The paper has thus a surface of 1 sq. m., and can absorb 100 C.c. of liquid. The capsule containing the spiral is dried in an oven, and, after placing the cover upon it, its weight is ascertained. The spiral is then removed, and a portion of the substance (about 2 Gm.) weighed out in the capsule, 6–8 Gm. of water added, and the substance dissolved at a gentle heat; the solution is then absorbed by the spiral. Care must be taken that none of the solution is left on the bottom of the capsule. The capsule and its contents are then heated at 100°–110° until the weight remains constant, which occurs in about two hours, when the lid is replaced, and after cooling the weight determined. The method is applicable to all substances which are difficult to dry, such as glucose, honey, wine, beer, etc.—Bull. de l'Assoc. des Chim., x., 656, through Jour. Soc. Chem. Ind.

Extemporaneous Preparation of Syrups—Fl. Extracts for the.—F. Ranwez (Journ. de Pharm. d'Anvers, 1894, 36) discusses, in a lengthy and highly interesting article, the principles of preparing fluid extracts, the legality of their employment for syrups, the formulas for their preparation, the means of preservation, and the process of verification. He insists upon making them according to the Codex of France, giving the syrup its official density, avoiding the use of glycerin and antiseptic substances, etc. As regards preservation, he prefers using alcohol, and advises to keep the fluid extracts in a cold cellar, and to sterilize them. To verify fluid extracts (except those prepared with the addition of sugar), the author determines their density, and their yield of dry extract and ashes; and these determinations are also applicable to the syrups themselves. He ends his essay with the following conclusions: 1. Fluid extracts for syrup should yield syrups identical with those of the Pharmacopœia. 2. Under those conditions the use of fluid extracts for the purpose in question is legal. 3. No substance other than alcohol should be added, for preservation purposes. The most recommendable method to avoid alterations consists in distributing the product in small flasks, and in an intelligent observation of the rules of asepsis.

Syrup of Hydriodic Acid.—O. C. Dilly (Registered Pharm., 1894, 67) remarks on the improvements in the U. S. P. (1890) preparation.

——— A view of a practitioner in medicine.—W. B. Stewart in Amer. Therap., 1893, 156.

Syrup of Calcium Phosphate.—Carles recommends the replacement of bibasic calcium phosphate, now in use, by tribasic calcium phosphate (in gelatinous form), and to distribute it in the syrup, thus rendering the addition of acid superfluous. He prepares it as follows: 115 Gm. of animal charcoal are treated with 150 Gm. of hydrochloric acid and 3 litres of water; after a few hours, enough water is added to make 10 litres. 100 Gm. of this liquid are titrated, to ascertain how much potassa is required to precipitate the phosphate; and this amount of potassa solution is likewise diluted to 10 litres and both liquids are mixed. The precipitate thus obtained is washed by decantation until neutral in reaction, which will take a few days, owing to its loose nature; the flowing off of the liquid will likewise last some length of time. The precipitate, placed on a cloth, contains, after 12 hours, about 90 per cent. of water. A syrup is obtained from 100 parts of this precipitate (corresponding to 10 parts of dry phosphate), with 245 parts of water and 655 parts of sugar, without heating.

The suspended calcium phosphate settles slightly in the course of time, but a little agitation distributes it again completely.—Jour. Pharm. Chim., 1893, 122.

Syrup Calcium Lactophosphate.—H. W. Aufmwasser.—Precipitates in the form of masses or clusters of minute crystals of cauliflower form cannot be prevented, but may be redissolved on warming the syrup. Precipitates of a granular crystalline powder form are due to the decomposition of a small part of the tetra-hydrogen-calcium-phosphate into mono-hydrogen-calcium-phosphate and free phosphoric acid, the presence of the latter producing a state of stable equilibrium. The more dilute the solution, the greater must be the relative proportion of free acid to keep up this stable condition. The remedy is therefore the addition of phosphoric acid to the prepared solution before dissolving therein the sugar. This solution is preferably made by using calcium carbonate and phosphoric acid instead of calcium phosphate. It must contain the calcium as tetra-hydrogen-calcium-phosphate, the decomposition of which is then prevented by adding phosphoric acid.

In practice, if the free acid is one-fourth of that used in obtaining the tetra-hydrogen salt, the soluble calcium salt CaH_42PO_4 will not suffer decomposition. It will not do to have a solution of tri-calcium, or of tetra-hydrogen-calcium-phosphate in presence of lactic acid alone, as in each case mono-hydrogen-calcium-phosphate will form. The presence of free phosphoric acid is necessary.

The following formula has been found to yield a permanent syrup :

Calcium carbonate	21.3	parts.
Phosphoric acid, 50 per cent	109.4	"
Lactic acid	33	"
Orange-flower water	80	"
Sugar	600	"
Distilled water, a sufficient quantity to make	1000	"

Dissolve the carbonate of calcium in the acids diluted with the orange-flower water, and with 150 parts of water filter the solution and wash filter with water to obtain 400 parts. In this dissolve the sugar, if necessary, with little heat.

Inasmuch as the "commercial soluble lactophosphate of calcium" has been proposed as a starting-point for this syrup, a good, readily-soluble specimen was examined.

Estimation in duplicate gave :

CaO	14.7	per cent.
P_2O_5	2.4	per cent.
Lactic acid	77.28	per cent.
Water by difference	5.62	per cent.
	100.00	per cent.

Calculating the P_2O_5 to tri-calcium phosphate, and remainder of calcium to calcium lactate, it contains one molecule $Ca_3 2PO_4$ to 28 molecules calcium lactate. As the proportion of the official formula furnishes 7 molecules $Ca_3 2PO_4$ to 28 of lactic acid, the use of the commercial soluble salt is not permissible.—Drug. Bull., 1893, 307.

Easton's Syrup.—A careful review of the subject of the preparation of this syrup has led R. Wright to the following conclusions:

(1) That the ferrous phosphate is best prepared by the direct action of phosphoric acid upon metallic iron.

(2) That the employment of the official syrupus ferri phosphatis in the process for making this syrup should be discontinued.

(3) That the quantity of sugar should be reduced by about 10 per cent., as suggested by Martindale and Clague.

The subjoined formula is drawn up in accordance with the above conclusions:

Take of—

Iron wire, free from oxide	75 grains.
Concentrated phosphoric acid, sp. gr. 1.5	11 fl. drachms.
Strychnine in powder	5 grains.
Phosphate of quinine	120 grains.
Simple syrup	13 fl. ounces.
Distilled water, a sufficient quantity.	

Place the iron wire and the phosphoric acid, previously diluted with an equal volume of distilled water, in a small flask, plug the neck with cotton-wool, and heat gently until the reaction is complete; then add the strychnine and the phosphate of quinine, and shake till dissolved; filter the solution into the cold syrup, wash the filter and add as much more distilled water as may be required to make the volume of syrup up to one pint.

The above preparation will contain 1 grain phosphate of iron, ¾ grain phosphate of quinine, $\frac{1}{32}$ grain strychnine in each fluid drachm.—Pharm. Jour. Trans., 1893, 191.

Permanent Syrup of Ipecac.—G. J. Geiger (Merck's Mark. Rep., 1893, 210).

Fluid extract ipecac	½ fl. oz.	[15 C.c.].
Loaf sugar	8 ounces	[250 Gm.].
Distilled water	enough to make 8 fl. oz.	[237 C.c.].

Mix the fluid extract with 3½ fl. oz. [104 C.c.] of the water, shake well, and filter. Put the sugar into a percolator, add the filtrate, and percolate, adding enough water to make ½ pint [237 C.c.].

Syrup of Ipecac and Opium.—H. L. Grimes gives the following:

Fld. ext. ipecac	30 C.c.
Tr. opii deod	335 C.c.
Glycerin	335 C.c.
Syrup (special)	q. s. ad. 3785 C.c.

Mix the fluid extract, tincture and glycerin; then add the syrup.

Formula for special syrup: 3175 Gms. sugar to 1420 C.c. of water.

Each fluid drachm represents about 30 Cgm. of Dover's powder or 3 Cgm. each of ipecac and opium.—Merck's Mark. Rep., 1894, 5.

Syrup of Iodide of Iron.—Rousillon prepares this syrup from a solution which he claims to be unalterable when kept. Iodine, 16.40 Gm.; iron filings, 8 Gm.; distilled water, 30 Gm.; heat together until the reaction is complete; filter solution whilst hot into a vessel containing pure glycerin, 220 Gm. The filter is washed with a jet of boiling distilled water until the contents weigh 240 Gm. Warm gently, pour into well dried vials, cork, paraffin. When required for use, mix with sufficient syrup. Both the solution and syrup thus prepared keep without change.—Jour. de Pharm. et de Chim., xxviii., 243.

——— Martenson points out that this syrup, when prepared with sugar which has been tinged with ultramarine, develops the red color so often met with, but if prepared with absolutely pure sugar it does not do so.—Pharm. Post, 1893.

——— Stick (Pharm. Zeit.; Drug. Circ., 1893, 178). Thirty parts of iodine and 100 parts of water are rubbed together, with the gradual addition of 15 parts of finely powdered iron, and kept so until reaction is complete. The liquid is then filtered into a flask containing 450 parts of sugar, and the filter washed with water. It is then heated, filtered hot, allowed to cool, again filtered and made up to bulk and kept in bottles, which should be quite full and in the dark. This preparation, he says, will keep clear and bright for months.

——— C. Levy (Jour. der Pharm. Els.-Loth.) recommends the addition of hypophosphorous acid (H_3PO_2), which prevents oxidation and is not objectionable from a therapeutic point of view. He proposes the following: Mix 16.5 Gm. of iodine with 720 Gm. (?) of distilled water, add, in divided portions, 9.1 Gm. of powdered iron, filter the green solution into a flask containing 8 Gm. of a 10 per cent. solution of hypophosphorous acid. This yields a 20 per cent. solution of FeI_2. He proposes to add 25 Gm. of this solution to 75 Gm. of raffinade (a liqueur).—Amer. Drug. and Pharm. Rec., 1894, 173.

——— O. Schobert. To 50 parts of water, that has been previously boiled and cooled, add 41 parts of iodine, and gradually under constant stirring sufficient powdered iron to form a greenish solution. This is filtered through a small filter into 850 parts of syrup and the filter washed with sufficient water (that has been previously boiled) to bring the weight, after the addition of 1 part of citric acid, to 1,000 parts.—Pharm. Zeit., 1893, 298.

——— Wm. Burns (Chem. and Drug.) states the following sources of loss in the B. P. process:

1. Heat of combination of iron and iodine is so intense that when effected in a flask a considerable amount of iodine is vaporized.

2. Filtration of a syrupy liquid, which is slow, with consequent formation of an oxy-iodide.

3. Washing is not directed, as decomposition would be induced. The finished product must be weaker by the amount absorbed by the filter and adhering to glass and wire.

Samples of official syrup, obtained from leading houses, were examined. The highest yield of ferrous iodide was 3.4 grains in ʒj.

The amount of ferrous iodide was estimated by M. Personne's method, which is based upon the following reaction with a semi-decinormal solution of perchloride of mercury:

$$(a)\ 2FeI_2+HgCl_2=FeCl_2+FeI_2HgI_2\ \text{(soluble)}.$$
$$(b)\ FeI_2HgI_2+HgCl_2=FeCl_2+2HgI_2.$$

When the iron and iodine are made to combine in a soda-water bottle, the fixation of all the iodine is effected in a few minutes. The cork can be removed before the temperature is sufficiently high to vaporize the iodine, whereby a considerable amount of the air is displaced by the aqueous vapor. The cork is replaced and the reaction assisted by shaking. The hot liquor thus obtained is filtered into the hot syrup, and sufficient hot distilled water added to make up to the required bulk. This syrup yielded 3.8 grains FeI_2 in a fluidrachm.—Drug. Bull., 1894, 123.

Syrup of Iodide of Iron—Glucose as a Preservative.—Wm. Lyon has repeated and extended the experiments of Klie, who had used glucose instead of cane sugar, and who had recommended that either the whole or part of the sugar should be displaced by glucose. The various syrups Mr. Lyon experimented with were all prepared according to the B. P. directions, the boiling being, of course, omitted. Placed in bottles only half filled, which were allowed to stand in a place not exposed to direct sunlight, and which were corked, at the end of two months a B. P. syrup was quite unfit for use, as was also one of the samples in which 1 per cent. of cane sugar had been replaced by glucose. Where the percentage of glucose ranged from 2 to 6 there was a gradual improvement, while where it was 8 per cent., or higher, there had been no decomposition. In syrups containing more than 10 per cent. of glucose precipitates formed, and as this would be a serious objection to the use of glucose as a preservative, a quantity of glucose had been prepared, and barium carbonate used to remove the sulphuric acid. The result so far had been satisfactory. If a pure glucose could be obtained, no serious objection could be taken to the presence of, say, 10 per cent. of it in the syrup, which would then keep for a considerable time.—Pharm. Jour. Trans., 1894, 863.

A Process for the Estimation of Iodine in syrup of iodide of iron has been formulated by G. Griggi, based upon the following reaction between potassium chlorate and ferrous iodide:

$$2FeI_2 + KClO_3 = Fe_2O_3 + KCl + I_4.$$

8 Gm. of the syrup are placed into a test tube, and 2 C.c. of a 5 per cent. solution of potassium chlorate in distilled water added. After heating the mixture until it assumes an ocherous red color, and allowing it to cool, 5 C.c. of pure chloroform are added, the tube is closed, cautiously agitated and then allowed to rest. The iodine set at liberty is taken up by the layer of chloroform, and imparts to it a beautiful amethyst-violet color. The chloroformic solution is decanted, added to sufficient distilled water, and the iodine is estimated by normal solution of sodium thiosulphate.—Boll. Chim. Pharm., through L'Union Pharm., 1893, 445; Amer. Jour. Pharm., 1894, 104.

Syrups Containing Ferri Phosphas, U. S. P.—W. H. Wearn (Bull. Pharm., 1893, 308) by experiments shows that the darkening of syrups containing ferri phosphas U. S. P. is due to the unfinished action of sunlight in its reducing power. Syrup in colored bottles remained unchanged under the direct action of the sun's rays for thirty-six hours, or four times as long as that in white bottles, after which the same change took place. Hence it is seen that colored glass will protect it a reasonable length of time, and that nine hours' exposure to sunlight will give a syrup permanent under all conditions, of a beautiful chlorophyll green color, free from ferric and richer in ferrous salts.

The author recommends that a concentrated solution of ferri phosphas be prepared and exposed to sunlight until a green color is developed, and evolution of oxygen gas ceases, after which it may be made into syrup of desired strength.

Syrup of Quinine, Iron and Calcium Lactophosphate.—E. Stern, in Pharm. Post, 1893, 551.

Quinine sulphate	2 parts.
Distilled water Dil. sulphuric acid	of each enough for solution.
Ammonia water	a sufficient quantity.
Lactic acid	2 parts.
Calcium lactophosphate	6 "
Iron lactate	3 "
Hot distilled water	12 "
Hot syrup	175 "

Dissolve the quinine sulphate with a sufficient quantity of diluted sulphuric acid and distilled water, precipitate with ammonia (water), filter, and wash carefully. Dissolve the pure quinine in the lactic acid, and add to the syrup. Then dissolve the iron lactate and calcium lactophosphate in the hot distilled water, in a mortar, add to the syrup and filter. Each teaspoonful contains, approximately, 5 Cgm. of quinine lactate, 7 Cgm. of iron lactate, and 15 Cgm. of calcium lacto-phosphate. It is described as of bright-yellow, clear color, and pleasantly bitter and somewhat acid taste; it leaves no disagreeable metallic taste in the mouth, keeps very long without losing its therapeutic activity, and deposits no sediment on standing. This syrup is used with good results in convalescence from protracted febrile diseases, pulmonary catarrhs, dyspepsia, and rachitis. The dose for children of 2–6 years is 2–3 small teaspoonfuls daily; for adults, 2–3 teaspoonfuls daily, in sweetened water, before meals.

Syrup of Rhubarb and Potash.—F. Edel, in Drug. Circ., 1894, 3.

Ground rhubarb	2 oz. av.
Ground hydrastis	of each, 1 “ “
Ground cinnamon	
Potassium carbonate	2 “ “
Oil of peppermint	20 min.
Sugar	4 lbs. av.
Diluted alcohol	6 pints.

Mix the ground drugs and the carbonate, add 5 pints of the diluted alcohol, allow to macerate, with frequent stirring, for 48 hours, let settle, decant the clear portion, and filter the remainder through absorbent cotton placed in the neck of a funnel. When this has drained through, add water until 6 pints of total percolate—or, more properly, macerate—are obtained, in which dissolve the peppermint oil and the sugar.

Syrupus Scillæ of Commerce.—D. J. Byrne (New Eng. Drug., 1893, 338) examined syrupus scillæ of the market for per cent. of acetic acid and albuminous matter, with the following results:

Albuminous matter, from	0 to .82 per cent.	(None in U. S. P.)
Acetic acid,	“ .88 to 4.41 “	(2.4 per cent. in U. S. P.)

Syr. Scillæ Comp.—To obviate the cloudiness on the addition of hot water to the U. S. P. syrup, Frank Edel adds 89 C.c. of glycerin to the same for every 473 C.c. of syrup.—Merck's Mark. Rep., 1894, 5.

Syr. Stillingiæ Comp.—F. Edel, in Drug. Circ., 1894, 3:

Ground stillingia	of each, 8 oz. av.
Ground corydalis (root)	
Ground iris	of each, 1 “ “
Ground sambucus	
Ground chimaphila	
Ground coriander	of each. 2 “ “
Ground xanthoxylum berries	
Sugar	5 lbs.
Distilled water	of each, a sufficient quantity.
Alcohol	
Syrup	

Mix all the ingredients except the last four, and thoroughly moisten with a mixture of 1 part of alcohol and 2 parts of water. After 48 hours' maceration, percolate to 5 pints, and in the percolate dissolve the sugar; finally, add enough syrup to make 1 gallon.

Syrup of Tea.—Infuse 2 parts of black tea with 10 parts of boiling water; macerate for 12 hours at a temperature of 15 to 20° C. Filter the liquid, using the first 8 parts, and with 12 parts of sugar make a syrup.—Zeits. Oest. Apoth. Ver., 1893.

Syrup of Tolu.—W. N. Wearn extracts the aromatic constituents of tolu and prepares salts of them with magnesium carbonate as follows: Triturate the balsam tolu with one-half its own weight of magnesium carbonate and sufficient water to form a thick paste; let this stand twelve hours, if the mixture is solid; if not, simply triturate, adding the required amount of water, filter and add the required amount of sugar to form syrup. The finished product will be a beautiful transparent syrup of rich balsamic flavor and taste, and of a light greenish yellow color.—Amer. Drug. and and Pharm. Rec., 1894, 88.

——— If kept for several months, the syrup exhibits alteration in both odor and taste. M. Ausaldy (L'Union Pharm., 1893, 425) heats such an altered syrup to violent ebullition (above 100° C.), when a disengagement of gas takes place, more or less abundant according to the degree of alteration; upon cooling the aromatic taste, although not very pronounced, will be found to have returned. Certain authors having suggested that the change rarely occurs in a syrup having an acid reaction, M. Ausaldy prepared the syrup from a balsam of tolu mixture, to which 0.50 Gm. of benzoic acid per liter of liquid had been added, and found the product to keep more than a year without change.—Amer. Jour Pharm., 1893, 551.

Violet Essence for Syrups.—Drog. Zeit.; Nat. Drug., 1893, 109.

Violets (the flowers)	500 Gm.
Alcohol	150 Gm.
Distilled water	150 Gm.

Mix the alcohol and water, and in the mixture macerate the violets for twelve hours. At the expiration of this time submit the violets to heavy pressure, set the liquid aside, and pack the violets in a percolater. Exhaust with warm water, and evaporate the latter down to 120 Gm. To the latter add the liquid obtained by pressure, let stand for three days, and filter. One part of the filtrate equals 15 parts of the ordinary essence.

TABLETS.

Tabloids.—A Qualitative and Quantitative Analysis of.—H. Helbing and F. W. Passmore have bestowed care upon the following factors: accuracy of dosage; purity of ingredients, and solubility in the preparation of compressed medicines, and have examined tabloids of potassium bromide; calomel, ½ gr.; arsenous acid, $\frac{1}{50}$ gr.; salicylate of sodium, 3 grs.; quinine bisulphate, 2 grs.; iron and quinine citrate, 3 grs.; antifebrin, 2 grs.; antipyrin, 5 grs.; morphine hydrochloride, ¼ gr.; strychnine sul phate, $\frac{1}{60}$ gr. The authors find in all preparations examined by them, a sameness in the accuracy of dosage, good quality of the chemicals, and ready solubility or disintegration of the tabloids.—Helbing's Pharm. Rec., July 29, 1893.

Tablet Triturates.—An article on their manufacture.—Drug. Circ. 1894, 124.

——— General consideration by F. Edel, in Amer. Drug. and Pharm. Rec., 1894.

Tablet Triturates and Compressed Tablets.—H. J. Lohmann considers the employment of compressed tablets better than that of tablet triturates. —Ibid., 1893, 303.

Compressed Drugs.—E. J. Parry and P. A. Estcourt, manufacturers, state that in many cases the use of an excipient is necessary in order to increase the solubility of the drug. This is hardly correct, for in the course of their analyses they have repeatedly found perfectly insoluble excipients used with freely soluble drugs. It may be taken almost for granted that excipients are used simply for the manufacturer's convenience, except in a few exceptional cases, such as disintegrating pellets.

The more common of the drugs sent out in this form, such as potassium chlorate, sodium bicarbonate, soda-mints, etc., are too cheap to adulterate· The only point in connection with potassium chlorate is the presence of chlorides, which is in such traces as to be of no importance. With regard to sodium bicarbonate they find that in almost every case a noticeable amount of carbonate is present, varying from 3 per cent. or 4 per cent. to even 8 per cent. in one sample. The only thing to be noticed in soda-mints, except that here, too, they find a large amount of carbonate, is that where the label indicates a certain quantity of ammonia there is seldom anything like the full quantity. But, of course, in this case it requires but a short time for the ammonia to volatilize, hence the deficiency. Ammonium chloride is usually sent out in three-grain pellets. A number of the pellets were weighed and the active ingredients determined by titration with silver nitrate.

The following results were obtained from five samples:

	Amount of NH_4Cl guaranteed, in grs.	Amount of NH_4Cl found, in grs.	Weights in grs.		
			Highest.	Lowest.	Mean.
1	3.0	3.08	3.23	3.07	3.17
2	3.0	2.66	3.16	2.62	2.91
3	3.0	3.03	3.16	2.95	3.03
4	5.0	5.79	6.10	5.26	5.84
5	5.0	4.70	4.80	4.60	4.70

They examined five samples of saccharin pellets, determining the saccharin by complete oxidation of the sample with nitrate of potassium and caustic potash, and the resulting sulphuric acid as barium sulphate. The following results were obtained:

Amount of Saccharin guaranteed, in grs.	Amount of Saccharin found, in grs.	Weights in grs. Highest.	Lowest.	Mean.
1 .5	.66	1.30	0.97	1.14
2 .5	.54	0.97	0.72	0.87
3 .5	.51	0.83	0.77	0.80
4 .5	.61	1.30	1.02	1.21
5 .5	.44	1.03	0.94	0.99

Some samples of sulphonal pellets were examined in the same way as the saccharin pellets, and others in more direct ways, depending on the excipient used. The following are the results for these pellets:

Amount of Sulphonal guaranteed, in grs.	Amount of Sulphonal found, in grs.	Weights. Highest.	Lowest.	Mean.
1 5.0	4.80	4.9	4.7	4.8
2 5.0	4.95	5.9	5.0	5.57
3 5.0	4.74	5.35	5.03	5.18
4 5.0	5.30	6.93	6.19	6.47

Antipyrine is a difficult drug to compress in a presentable manner without excipients. Their results for these pellets were as follows, the methods used being varied, as the circumstances required:

Quantity of Antipyrine guaranteed, in grs.	Quantity of Antipyrine found, in grs.	Weights in grs. Highest.	Lowest.	Mean.
1 5.0	4.29	4.55	4.03	4.29
2 5.0	4.86	6.24	5.98	6.07
3 5.0	4.31	5.39	4.80	5.11
4 5.0	3.80	5.19	4.55	4.89

Quinine pellets, as they have obtained them, are often made with the acid sulphate, but quite as often with the neutral salt. Here their usual method was to precipitate the quinine in the usual way with sufficient ammonia, and dissolve out the quinine with chloroform or ether. Their results in this case were very satisfactory:

Amount of Quinine Sulphate guaranteed, in grs.	Amount of Quinine Sulphate found, in grs.	Weight in grs. Highest.	Lowest.	Mean.
1 3.0	3.06	3.51	3.33	3.40
2 2.0	2.02	6.50	5.60	6.06
3 5.0	4.41	5.64	5.30	5.50
4 2.0	2.06	4.50	4.00	4.25

—Pharm. Jour. Trans., 1894, 592.

TINCTURÆ.

Maceration and Expression vs. Percolation in Preparation of Tinctures. —G. Kring, in Nat. Drug., 1894, 41. Maceration and expression, where recovery of alcohol is not possible, is more economical. Perfect percolation does not entirely depend upon the dropping of the percolate, nor the slower the drops, the more perfect is the percolation. The author takes as a criterion of proper percolation, the not too firm packing of the drug. He gives example of tincture rhei arom. in the making of one quart as being equivalent to loss of 6 ounces of alcohol and loss of extraction of active principles in drug.

Tinctures in Canada.—Statement of challenges by the Canadian Int. Rev. Dept. on parties employing tinctures deficient in alcoholic strength. —Brit. and Col. Drug., 1894, 318.

U. S. and Canadian Tinctures.—Variation in the preparations and calling attention to some risks of travelers.—Bull. Pharm., 1893, 564; from Montreal Pharm. Jour.

U. S. and B. P. Tinctures.—Comparison in Bull. Pharm., 1894, 8.

Pharmacopœia Tinctures.	Drug in B. P. Tinct.	Drug in U. S. P. Tinct.
	Per cent.	Per cent.
Aconite	12½	35
Aloes	10	30
Arnica Root	5	10
Asafœtida	12½	20
Belladonna	5	15
Calumba	12½	10
Cannabis Indica	5	15
Cantharides	1¼	5
Capsicum	3¾	5
Catechu	17½	15
Chiretta	12½	10
Cimicifuga	12½	20
Cinchona	20	20
Cinnamon	12½	10
Colchicum Seeds	12½	15
Cubeb	12½	20
Foxglove	12½	15
Galls	12½	20
Gelsemium	12½	15
Green Hellebore	20	40
Ginger	12½	20
Hemlock	12½	
Henbane	12½	15
Hops	12½	20
Hydrastis	10	20
Kino	10	10
Lobelia	12½	20
Myrrh	12½	20
Nux Vomica	1½ ext.	2 ext.
Opium	7½	10
Orange Peel, bitter	10	20
Pellitory	20	20
Quassia	3¾	10
Rhatany	12½	20
Rhubarb	13¾	12
Saffron	5	10
Squill	12½	15
Serpentaria	12½	10
Stramonium	12½	15
Sumbul	12½	10
Valerian	12½	20

Alkaloidal Tinctures of the B. P.—Suggestions for their standardization by E. H. Farr and R. Wright. The authors summarize in a table the results of their past labors on this subject (see Proc. 1892, 1893). The results recorded show that tinctures prepared from carefully selected drugs vary considerably in strength, and it is to be inferred that commercial tinctures would indicate a much greater variation. The question arises as to whether nothing can be done to produce tinctures of definite strength, and the authors conclude that the most feasible plan for the production of tinctures of constant strength consists in the preparation of a strong tincture by percolation, and its subsequent dilution to the required standard.

By such a plan as this the employment of heat is avoided, the natural combinations of the drug are preserved, and the active principles are distributed through such a volume of liquid as may be relied upon to ensure the stability and permanence of the resulting preparation. Preliminary experiments were next undertaken in order to ascertain how far it would be necessary to carry percolation in order to secure the practical exhaustion of each individual drug.

For this purpose 100 Gm. of the drug, in powder of the requisite degree of fineness, was moistened with menstruum, packed in a conical percolator, more menstruum was then added, and percolation allowed to proceed. The percolate was collected in fractions of 100 C.c., and the amount of alkaloid and extract in each fraction was estimated by the processes described in the series of notes on tinctures already published by them.

The results obtained are shown in Table II. (See Original.)

TABLE II.—SHOWING PERCENTAGE OF ALKALOID AND EXTRACT YIELDED BY FRACTIONS OF PERCOLATE FROM DIFFERENT DRUGS.

Tincture.		Alkaloid.					Extract.				
		Fraction 1.	Fraction 2.	Fraction 3.	Fraction 4.	Fraction 5.	Fraction 1.	Fraction 2.	Fraction 3.	Fraction 4.	Fraction 5.
Aconite....1...	(*a*)	.340	.105	.022	.004	.002	—	—	—	—	—
	(*b*)..........	.470	.145	.026	.004	.002	13.22	6.54	1.87	.82	.55
do. ....2...	(*a*)	.490	.060	.016	.006	.004	—	—	—	—	—
	(*b*)..........	.720	.100	.020	.006	.004	18.16	7.42	1.98	.71	.51
Belladonna	(1)..........	.460	.050	.036	.016	.004	7.90	2.16	1.11	.63	.54
	(2)..........	.400	.220	.088	.068	.025	14.26	6.90	3.52	1.98	1.30
Cinchona	(1)...... ...	3.12	1.66	.60	.42	.30	18.84	8.86	2.78	1.56	1.02
	(2)..........	2.91	1.68	1.04	.56	.34	17.48	9.52	5.40	2.54	1.56
Colchicum......	(1)..........	.580	.175	.034	.012	.004	13.46	1.34	.58	.30	.14
	(2)..........	.505	.030	.005	.004	nil	17.10	7.52	.88	.62	.42
Conium	(1)..........	.650	.135	.038	.024	.016	15.76	5.90	1.86	.70	.42
	(2)..........	1.373	.351	.074	.039	—	7.32	3.76	1.32	.81	.61
Gelsemium	(1)..........	.112	.048	.022	.022	.018	7.91	1.18	.34	.28	.26
	(2)..........	.280	.052	.016	.006	.003	13.28	2.08	.38	.20	.16
Hyoscyamus ...	(1)..........	.064	.024	.010	.004	.001	16.72	8.46	3.54	1.26	.86
	(2)..........	.038	.014	.008	.004	.002	11.80	6.84	3.70	2.14	1.24
Jaborandi	(1)..........	.320	.140	.006	.002	.001	17.10	7.52	.88	.62	.42
	(2)..........	.400	.205	.066	.016	.011	14.84	8.38	2.46	.82	.50
Lobelia	(1)..........	.180	.050	.016	.010	.004	11.08	2.94	1.10	.60	.36
	(2)..........	.152	.052	.022	.010	.004	8.70	3.80	1.68	.80	.44
Nux vomica....	(1)..........	1.825	.336	.044	.020	.014	13.98	2.12	.44	.22	.16
	(2)..........	.850	.172	.050	.019	.006	5.92	1.14	.39	.21	.13
Stramonium	(1) Seeds....	.180	.028	.020	.020	.008	3.50	.70	.44	.34	.32
	(2) Leaves ..	.180	.060	.036	.016	.008	9.90	3.74	2.34	1.22	.64
Veratrum viride	(1)..........	.450	.150	.040	.032	.008	4.80	1.26	.50	.48	.40
	(2)	.550	.130	.028	.008	.004	12.36	5.18	1.30	.44	.32

Note.—1. The figures for the aconite alkaloid represent (1) ether soluble, and (2) total alkaloid.
2. The conium alkaloids were weighed as hydrochlorates.

From the results shown in the table it will be seen that a large proportion of the alkaloid is found in the first fraction of the percolate.

In the case of cinchona the alkaloid present in this fraction amounts to 47 per cent. of the whole; in the leaf tinctures from 60 to 66 per cent., in conium and veratrum about 70 per cent., while the first fraction, collected from aconite, colchicum, and nux vomica, actually contained 80 per cent. of the alkaloid present in the drug operated upon.

A further inference to be drawn from the results given in the table is that the practical exhaustion of such drugs as aconite, colchicum, and nux vomica may be effected by the employment of drug and menstruum in the proportion of 1 to 3; that of conium and veratrum in the proportion of 1 to 4; and that in no case would it be necessary to carry percolation beyond 15 fluid ounces in order to exhaust the quantity of drug representing a pint of tincture.

The process followed in order to produce a standardized tincture was to take the amount of drug ordered in the Pharmacopœia for a pint of tincture, moisten with menstruum, pack in a conical percolator, add more menstruum, and allow percolation to proceed until 10, 12, or 15 fluid ounces percolate had been collected. The marc was expressed, and the expressed liquid added to the percolate, which was then assayed, and a sufficient volume of menstruum added to dilute the tincture to the required standard.

The volume of percolate to be collected in each case, together with the alkaloidal standards proposed, are shown in Table III.

Table III.—Showing Results Obtained in Preparing Standard Tinctures.

Tincture.	Volume of percolate collected.	Percentage of alkaloid in percolate.	Proposed standard per cent.	Percentage of extract in finished tincture.
Belladonna	12 fl. ozs.	.068	.025	1.0
Cinchona	15 fl. ozs.	1.27	1.0	6.28
Colchicum	10 fl. ozs.	.156	.075	2.04
Conium	10 fl. ozs.	.520	.25	1.66
Gelsemium	12 fl. ozs.	.056	.025	1.26
Hyoscyamus	12 fl. ozs.	.012	.010	4.14
Jaborandi	12 fl. ozs.	1.24	1.0	3.78
Lobelia	15 fl. ozs.	.052	.025	1.08
Nux vomica	12 fl. ozs.	.360	.250	1.24
Stramonium	12 fl. ozs.	.037	.025	1.48
Veratrum viride	15 fl. ozs.	.160	.1	3.40

Note 1. The standard proposed for tincture of conium is equivalent to .2 per cent. coniine.

Note 2. The tincture of stramonium is made from the leaves.

The results of experiments on the exhaustion of aconite root are given in Table II., but the authors are not in a position to make any proposal for the standardization of the tincture. For the production of standardized tincture of opium the following process is proposed:

Take of

Moist opium in slices	2 ounces.
Distilled water	14 fluid ounces.
Rectified spirit	7 fluid ounces.

Rub the opium with the distilled water until it is thoroughly disintegrated, macerate for six hours, add the rectified spirit and macerate for seven days, strain and press, adding the pressings to the strained tincture, and filter. The percentage of morphine is estimated by a modification of the B. P. process for the assay of opium (Chemist and Druggist, vol. xlii., p. 77), and a sufficient quantity of a mixture of one measure rectified spirit and two measures water is then added to reduce the amount of morphine in the tincture to .75 per cent.—Pharm. Jour. Trans., 1893, 177.

Tinctura Ferri Chloridi Ætherea.—O. Schobert. On mixing 10 C.c. ethereal tincture of chloride of iron with 10 C.c. official potassium acetate solution, and shaking, 4 C.c. of ethereal liquid are obtained, and not 3 C.c. —Pharm. Zeit., 1893, 438.

Tinctura Ferri Acetici Ætherea.—O. Schobert recommends mixing together the alcohol and acetic ether before adding the liquor ferri acetici. The tincture, when finished, should be put in well-stoppered, dark colored bottles, and kept in a cool, dark place.—Ibid.

Tincture of Iodine.—C. F. Henry has made a series of experiments, the results of which seem to indicate that the following formula will most suitably meet all requirements:

Iodine	1¼ oz.
Iodide of potassium	1¼ oz.
Distilled water	½ fl. oz.
Glycerin	½ fl. oz.
Rectified spirit, sufficient to make	20 fl. oz.

Add the iodine and iodide of potassium to the water, allow to stand till dissolved, then add the glycerin and sufficient rectified spirit to make twenty fluid ounces. Such a tincture (1 in 16) would be suitable for both external and internal use, and is miscible with water in all proportions. The dose would be two to eight minims, and 24 minims to the fluid ounce would make a vapor iodi corresponding to the present official vapor iodi (B. P).—Pharm. Jour. Trans., 1894, 745.

——— (*Commercial*).—F. H. Nickerson (Bull. Pharm., 1893, 447) examined 20 preparations by the following method of assay: A weighed amount of the tincture is titrated with solution of sodium arsenite, whose iodine equivalent has been carefully determined, using starch solution as an indicator. This gives the amount of free iodine in the liquid. The iodine in another weighed portion of the tincture is now, by the addition of excess of solution of sodium arsenite, reduced to sodium iodide. Excess of solution of silver nitrate is added, precipitating all of the iodine as silver iodide. The solution is now strongly acidulated with nitric acid, dissolving both the silver arsenite and the silver arsenate, formed by the addition of the silver nitrate, while the silver iodide, being insoluble in dilute nitric acid, is unaffected. The precipitate is collected on a weighed asbestos filter, dried at 150°, and weighed. This gives the total amount of iodine present. Subtracting from this the amount present as free iodine, gives the quantity present as hydriodic acid. The free iodine ranged from 3.77 to 7.22 per cent.; hydriodic acid, from .00 to .48 per cent; total iodine, 4.05 to 7.33 per cent.

Tincture of Iodine and Potassium Iodide.—A. Erlenmeyer, in Pharm. Centralh., 1893, 725:

℞. Iodi puri.	
Kali iodati	āā 1.0 Gm.
Aquæ destillatæ	2.5 Gm.
Tincturæ iodi	15.0 Gm.

Tinctura Opii.—J. has experimented in macerating tinctura opii for 2 and 3 days and finds that after 2 days the sp. gr. is 0.976, above which it will not go, even with prolonged maceration.—Pharm. Zeit., 1893, 511.

Tinct. Quininæ Ammon.—Chem. and Drug., 1894, 245.

Sulphate of quinine	160 gr.
Proof spirit	6 oz.
Comp. tincture of chloroform	2½ "
Solution of ammonia	2½ "
Glycerin to make	20 "

Mix in the above order.

Warburg's Tincture.—F. A. Sieker employs 6 vols. alcohol and 4 vols. water instead of dil. alcohol (N. F). Digestion might replace 48 hours' maceration, followed by percolation.—Notes on New Rem., 1893, 102.

Tr. Zingiberis.—Drug. Zeit.; Nat. Drug., 1894, 26.

Ginger, unbleached	500 parts.
Calamus	31 parts.
Cinnamon	31 parts.
Haselwort (asarabacca)	31 parts.
Mace	31 parts.

Powder and mix. Wet thoroughly with alcohol of 85 per cent. and pack into a percolator; let macerate for twenty-four hours, and then exhaust with alcohol of 85 per cent. until 2,000 parts of percolate are obtained.

UNGUENTA.

Ointments and Cerates.—C. E. Sonnenburg writes of the preparation of some official and unofficial ointments and cerates, among which are: Nutmeg cerate, calamine ointment, boroglycerin ointment, compound galbanum ointment.—Drug. Circ., 1894, 28.

Ointment Bases.—Shoemaker (Medical News) reviews and discusses the various ointment bases, and concludes that in the majority of cases our choice must rest upon lard or lanolin. Petroleum jelly resists chemical change and is pleasant in appearance, but it is apt to be contaminated with irritant impurities, and its absorbabilty is slight. Lard is readily absorbable, but readily undergoes decomposition. Lanolin is almost devoid of odor, very rapidly absorbed, aseptic, and unalterable.—Amer. Drug. and Pharm. Rec., 1894, 276.

—— *Degree of Sub-division.*—E. Dieterich publishes the results of some preliminary investigations on the comparative degree of subdivision of the insoluble powders entering into different ointments as found by examining samples obtained from various sources. Samples No. 1 were made by improved machinery, Nos. 2 and 3 were made by hand by himself, while the others were obtained from reputable apothecaries. In the table following the diameters of the particles are expressed in micromillimeters, and are for (1) maximum and (2) average values in any given sample, the minutest ones being excluded from consideration. Only a few of the examples quoted by the author are here reproduced:

Sample.	Ung. Hydr. Ciner.		Ung. Zinci.		Ung. Plumb. Carb.	
	Maximum.	Average.	Maximum.	Average.	Maximum.	Average.
	m.	m.	m.	m.	m.	m.
1	0.9168	0.2535	0.168	0.126	0.246	0.168
2	....	....	0.420	0.252	1.418	0.756
3	2.604	1.344	0.756	0.345	1.520	0.756
4	2.604	1.344	1.596	0.840	1.428	0.756
5	....	....	1.596	0.840	1.450	0.756
6	....	....	2.520	0.930	3.980	2.520
7	....	....	0.420	0.252	1.500	0.756

Sample.	Ung. Hydr. Rubr.		Ung. Hydr. Alb.		Ung. Acid. Boric.	
	Maximum.	Average.	Maximum.	Average.	Maximum.	Average.
	m.	m.	m.	m.	m.	m.
1	2.100	1.596	0.246	0.168	2.542	1.344
2	2.320	1.680	0.508	0.336	3.950	2.100
3	2.460	1.680	0.750	0.420	3.850	2.520
4	6.368	4.560	1.135	0.625	4.230	2.352
5	2.460	1.680	2.645	1.848	3.040	2.520
6	2.650	1.840	1.204	0.652	3.850	2.520
7	....	....	1.680	0.756	1.770	0.756

It would seem that there is little uniformity in the different samples, and the author expresses the opinion that this is an evil that should eventually be remedied by the pharmacopœias prescribing a microscopical test for all official ointments, a basis for this to be laid by further investigations in this direction. He further states that he is applying a similar test to vegetable powders, the results of this work to be published in the near future. —West. Drug., 1893, 218; from Pharm. Centralh., 1893.

Preparation of Simple Ointments.—P. Boa (Pharm. Jour. Trans., 1894, 861) objects to the usual process of preparing simple ointment and others of a similar nature, by stirring constantly until cold the liquefied mixture. He states that the effect of stirring is to incorporate a certain amount of air which, he calculates, increases the bulk of the ointment by 1-16 and renders the ointment more opaque. This air, being unsterilized, he thinks not only thwarts in a measure the object of the ointment, viz., to keep air away from fresh wounds, etc., but it may also introduce septic organisms to the freshly abraded surface in a fit condition for invasion. The stirring to produce homogeneity he thinks unnecessary, and states that he always secures smooth, satisfactory ointments by simply melting the ingredients together and allowing them to cool, The ointment made in this way is firmer and has a slightly higher melting point. It also keeps better.

Analysis of Lard.—C. A. Neufeld comes to the conclusion that neither Hübl's test nor the silver reaction are of much use in testing for small quantities of adulterants.—Chem. Central, 1893, 778; from Arch. Hygiene, 17.

Lard.—Dieterich finds the iodine number 52.09 to 63.26 and the acid figure, 0.28 to 1.96. M. P., 37° to 42° C.—Helfenberger Annalen; Pharm. Post, 1894, 426.

Cotton-Seed Oil in Lard.—W. G. Crooks (Analyst, 1893, 221). Place about ten grains of the sample to be examined in a cup-shaped porcelain capsule of about half an ounce capacity. A small disk of white filter paper (which has been soaked in hydrochloric acid, thoroughly washed with distilled water, and dried) is *just moistened* with a 12 per cent. solution of nitrate of silver, and placed in the concave part of a watch-glass, which, with the paper downward, is then inverted over the capsule containing the sample. The capsule is then put in a shallow oil-bath, to which heat is gently applied, until a thermometer in the bath reaches 240° F. The source of heat is then *immediately withdrawn*. It was found that if even less than 1 per cent. of heated cotton-seed oil be present in the sample, a very marked coloration takes place on the disk, varying from a light brown to nearly black. If the sample under examination be pure and fresh, the disk is apparently unaffected.

——— F. Gautter (Zeitsch. f. Anal. Chem., 1893, 308), states that he has met with several samples of cotton-seed oil which failed to give a silver reaction, and also a number of samples of lard strongly suspected of adulteration with cotton oil which gave no indications by Becchi's test. He concludes that some treatment of the oil is now adopted with a view to circumvent analysis. He has modified the sulphuric acid test which depends upon the dark colorations produced with cotton-seed oil, but not with lard, and has in this respect followed Flückiger (Zeitsch. f. Anal. Chem., vol. x., p. 235), who recommended dilution of the oil to be tested with ether, benzol, chloroform or carbon bisulphide, in order to moderate the action of the sulphuric acid. He takes 1 C.c. of the oil or fat to be tested, adds 10 C.c. of petroleum ether, and a single drop of strong sulphuric acid, shaking violently at once. Pure lard becomes straw colored, or faint reddish yellow; after some time the solution becomes clear and colorless, or nearly so, while dark red droplets separate. Cotton-seed oil at once becomes dark-brown or black, and the solution remains so for a very long time. Mixtures take on a more or less dark-brown shade; even 1 per cent. of cotton-seed oil mixed with lard showing the reaction plainly. Olive oil behaves in a similar manner to lard, but ground-nut oil resembles cotton-seed oil. The author also gives a number of iodine figures for pure and mixed lard, which differ considerably from those found by others. He is of opinion that pure lard should not absorb above 27 per cent. of iodine. It is noted by the Analyst that the coloration produced by sulphuric acid is almost entirely dependent upon the quantity of sulphuric acid added. A sample of lard dissolved in petroleum ether as directed by the author remained uncolored by a single small drop of sulphuric acid; with a large drop became yellowish, and brown with two drops. The same changes were observed with a number of other samples. It appears to the abstractor that neither the method nor the iodine figures given by the author are trustworthy.

Commercial Analysis of Lard.—H. Schweitzer and E. Lungwitz describe a test introduced by themselves depending on the action of phosphomolybdic acid, which gives no coloration with a solution of pure lard in chloroform or ether, but readily shows the presence of cotton-seed oil by the blue tint produced. A device for rapidly ascertaining the iodine number is also described. The lard is kept at a temperature of 45° C. for twenty-five minutes, when results are obtained virtually the same as by waiting fourteen hours at normal temperature. The authors also attach considerable value to the temperature of crystallization. The temperature of warm lard in the process of cooling will remain constant for a short time somewhere between 24.5° and 26.5° C., after which it will rise about one degree. The presence of adulterants notably alters these figures. In conclusion the authors state that by the application of the foregoing tests they could obtain the materials for a full report in one and a half hour.—Chem. and Drug., 1894, 758.

——— Rimington found that a sample of pure lard melting at 98° F.

gave an iodine absorption of 49. This figure in a lard of his own rendering was 52. He had to confess that very different results were obtained by the same test from the same sample, and he thought there was still much to be done in this field of research.—Ibid.

Estimation of Beef Fat in Lard.—W. F. K. Stock's process is based on the slight solubility of beef stearin in ether at 13°. The requisites are: six 25 C.c. graduated test-mixers fitted with glass stoppers; ether of 0.720 specific gravity; a set of mixtures of pure lard melting at 34–35° C., with 5, 10, 15 and 20 per cent. of beef stearin melting at 56° C.; a second set of mixtures of pure lard melting at 39–40° with beef fat melting at 50° C.

The melting point of the sample is taken by the capillary tube method twenty-four hours after the tube has been filled. Suppose the melting point to be at 34° C., 3 C.c. of the melted fat is run into one of the test-mixers and dissolved in 21 C.c. of ether, then placed in water at 20–25° C. 3 C.c. of each of the first set of mixtures is dissolved in exactly the same way. The five tubes are then cooled down to 13° C. and allowed to remain at that temperature (particularly towards the last) for twenty-four hours. The apparent volume of deposit in each tube is then noted, and this will give an immediate clue as to the condition of the sample. The ether is poured off from the tubes as far as possible, and 10 C.c. of fresh ether at 13° C. is added in each case. The stoppers are inserted, the tubes well shaken, and after deposit has settled the operation is repeated. The whole contents of the tubes are now transferred to weighed shallow beakers. The ether is carefully run off, and the deposits are dried for fifteen minutes at 10° C. The beakers are cooled and weighed, and the standard weight nearest to that of the sample is used as the factor by which to calculate the beef fat. For samples with a higher melting point, the second set of mixtures should be used. The actual presence of beef fat must be proved by the microscope. For this purpose a few particles of the dry residue are placed on a slide, moistened with alcohol, and covered. Very moderate pressure should be applied to the cover, and the slide viewed with a 1-inch objective and the C eye-piece. The presence of beef stearin may often be recognized by the naked eye. As regards pure lard, the author is enabled to state that no sample melting below 39° gives more than 0.011 Gm. of ether-washed deposit. A sample melting at 45.8° C. gave, however, 0.146 Gm. of deposit. This shows the necessity of having the two sets of standard mixtures and carrying out the analysis by a strict comparison test. Direct experiment has shown that neither cotton-seed oil, palm-nut-kernel oil, nor cocoa-nut oil, interferes with the deposition of the crystals of beef stearin.—Analyst, 1894, 2–7.

Adeps Lanæ and Lanolinum Anhydricum.—Dieterich compares analyses of nine samples.—Helfenberger Annalen; Pharm. Post, 1894, 426. The method for determination of the amount of water present in lanolin by estimation of the loss in weight upon heating to 100° C. is not correct. He has distilled lanolin with water at 100° C., and upon examination of the distillate found it to give the iodoform reaction with caustic alkali and potassium iodide solution, so that, therefore, the distillate contains presumably an alcohol. Dieterich also objects to the statement that lanolin does not become rancid. Lanolin which he himself had prepared, in 1886, indicated when fresh the acid number 0.84; upon keeping for six and a half years in a well-closed glass vessel, it indicated 17.36 and had a pronounced rancid odor, and the cork was bleached and had become brittle.

Œsypus versus Lanolin.—An editorial on the trial for infringement of a patent under which a claim was made to the exclusive right of manufacturing cholesterin fat from sheep's wool. The bogey of "free fat acids" and the professed inability of chemists, in 1882, to effect their separation from wool-fat, formed the foundation upon which the defendant was enabled to assert that the use of the alkali for the purpose constitutes the "pith and marrow" of the invention. This view of the matter was accepted by the judge, and on that basis he declared lanolin to have been, in 1882, a "hitherto unknown compound"—that the patent is good, and that it has been infringed by making use of the previous well-known process of settlement by gravitation for separating wool-fat from the ordinary washings of sheep's wool.—Pharm. Jour. Trans., 1893, 507.

Œsypum and Lanolin.—J. H. Heaf, in Brit. and Col. Drug., 1894, 228. A historical account of wool-fat.

Lanolin Reactions.—0.1 Gm. lanolin incorporated with 10 C.c. concentrated sulphuric acid gives an intensely red liquid with a greenish fluorescence, the depth of color depending upon the purity of the lanolin: if 10 C.c. chloroform be added to the above, agitated and allowed to separate, the chloroform layer will have a bright red color, while at the line of contact of the two liquids, a black line will be noticeable; these results by comparison with pure lanolin will indicate the purity of the sample examined.—Astolfi (Boll. et Chim. Farm.), Apoth. Ztg., 1894, 94.

——— Add 1.5 to 2.0 Gm. of potassium hydroxide to 0.1 Gm. of lanolin, which has been placed in a porcelain capsule, and then keep melted for a short time, but be careful not to carbonize the mixture. Dissolve after cooling in 5 C.c. of water, and shake with 5 C.c. of chloroform. The chloroform solution thus derived is carefully poured on sulphuric acid in a test tube. At the point of contact of these two layers the characteristic deep-red color of cholesterin appears.—West. Drug., 1893, 449.

——— Hilger (Nat. Drug., 1894, 53). 10 Cgm. of lanolin and 2 Gm. calcium hydrate, are melted together, care being exercised to prevent carbonization of the mass, and the latter, after being allowed to cool, is treated with 5 C.c. distilled water, and shaken with a like amount of chloroform. On pouring the latter upon an equal volume of concentrated sulphuric acid, the deep red reaction of cholesterin will appear at the line of demarcation of the two liquids.

Adeps Lanæ.—F. Lascar found adeps lanæ of commerce to fulfill the requirements of U. S. P. The new wool-fat was found to be superior in some respects to a number of the hydrated wool fats now on the market. Its melting point, for example, was lower, and all attempts to saponify it with alkalies were unsuccessful. In the Pharmacopœia, the melting point of anhydrous wool-fat is stated at 40° C., but he found the new adeps lanæ to melt at less than 35° C.—Amer. Drug. and Pharm. Rec., 1894, 88.

Anhydrous Wool-Fat.—The process by which it is manufactured is said to differ materially from that in vogue, and will be published in detail as soon as the patent is perfected. By the new method the wool-fat may be obtained at will of varying consistency, with corresponding melting points, so that it may range from a semi-fluid form to that resembling lard. This would prove an undoubted advantage, for the higher meting point, 40° C. and over, of lanolin, and its relative tenaciousness owing thereto, has been a decided drawback, which was only partially remedied by the addition of water or vegetable oil. A legal war is at present waging between the interested manufacturers as to the right of adding water to any wool-fat other than that of Jaffé & Darmstaedter.—G. Vulpius, in Chem. Zeit. (Rep.), 1893, 199.

Lanolin Boro-Glycerinatum.—20 Gm. boric acid; 100 Gm. glycerin; 50 Gm. distilled water. Warm till solution is obtained, and then mix with 350 Gm. anhydrous lanolin and 130 Gm. olive oil.—Apoth. Soc., Berlin; Pharm. Rund., 1893, 186.

Use of Lanolin.—Jour. Soc. Chem. Ind.; New Eng. Drug., 1894, 135. A new use for lanolin is found in combining it with gutta-percha or India rubber at a temperature of 100° C. for making various rubber goods.

Chlorine in Wool-Fats.—The presence of chlorine in lanolin, adeps lanæ, and similar preparations is shown in the following manner: Boil 2 Gm. of the suspected material with sufficient alcohol; cool, filter, and to the filtrate add an alcoholic solution of silver nitrate. If chlorine be present it will be manifested by the usual reaction and the precipitation of silver chloride.—Nat. Drug., 1894, 27. (See also H. Beckurts in Pharm. Zeit., 1894, 470, and Liebreich in Pharm. Zeit., 1894, 408).

Aliphatic Acids of Lanolin.—J. de Sanctis. Lanolin was treated with hot sodium ethoxide solution, and the sodium salts deposited were then extracted with ether to remove basic compounds. The acids not volatile in a current of steam were found to be cerotic, palmitic, normal caproic, and oleic acids. Those volatile in a current of steam were stearic, isovaleric, and normal butyric acids. The acids were separated by means of their lead salts, and analyzed quantitatively.—Gazzetta, 1894, 14; Jour. Chem. Soc. (Abs.), 1894, 274.

Ointment of Lead Subacetate is known to turn yellowish in a few days after its preparation, with the disengagement of free acetic acid. This Hendrix ascribes to the formation of lead superoxide, the intensity of coloration depending on the amount of superoxide generated. By employing lanolin for the body a comparatively stable ointment will be obtained.—West. Drug., 1894, 181.

Mercurial Ointment.—Anhydrous wool-fat forms a splendid basis for extinguishing mercury; it is possible to extinguish 1,000 Gm. mercury with 200 Gm. anhydrous wool-fat.—E. Buch, Pharm. Ztg., 1894, 40.

——— G. Bagle recommends the following process: Put into the mortar 100 parts of an already prepared ointment, and add 500 parts of mercury. Triturate rapidly, and while doing so pour over the mixture 50 parts of sulphuric ether. Continue the trituration and in a few moments the mercury will be in a state of the minutest subdivision, when one can add 100 parts of lard (or vaseline, or lanolin). A few minutes of vigorous trituration completes the operation. If upon close examination a few globules of uncomminuted mercury be seen, add a trifle more ether and triturate. Finally add the other ingredients and incorporate. This method not only saves a great deal of time and labor, but insures a more perfect comminution of the mercury.—Jour. Pharm. d'Anvers; Nat. Drug., 1894, 139.

Ung. Naphthalini Comp.—In Pharm. Zeit.; Chem. and Drug., 1893, 491.

Naphthalin	ʒij.
Acid. benzoic	ʒj.
" boric	ʒj.
Vaselin. c. cerâ flav. (3 : 1)	℥ij.
Bals. peruv	ʒj.
Tinct. benzoini	ʒij.

M. Ft. unguent.

Resorbin, a new ointment base, is an emulsion of sweet almond oil, containing a small quantity of wax, with a dilute aqueous solution of gelatin or soap.—Pharm. Centralh., 1893, 688.

New Ointment.—Carles (Rép. de Pharm., 1893, 57). Mix thoroughly in a mortar 5 Gm. of concentrated sulphuric acid with 25 Gm. of unsalted butter. The latter will assume a salmon color; it may now be kept in closed vessels, but contact with minerals should be avoided. It will keep for some years, it is reported, although it will harden a little. This ointment is reported to be efficacious in neuralgia, localized rheumatism, etc.; its effect is said to be as prompt as that of a sinapism, with the advantage in its favor of not emitting the disagreeable odor so intolerable to certain patients. When it is to be used, the required quantity is taken out with a wooden spatula, a whalebone, the handle of a spoon, or the index finger, and gently rubbed with cotton or the tip of the finger over the aching spot, and at once covered with cotton or wool. Soon a sensation of increasing warmth is experienced, followed by an erythema, which, however, does not result in a blister.

Sevum.—Dieterich gives M. P., iodine numbers and acid figures. When the acid figure is higher than 2, even though the product is otherwise normal, it should be rejected.—Pharm. Post., 1894, 427; from Helfenberger Annalen.

Vaseline as a Trade Mark.—Editorial on the legal decision of the Supreme Court in New York.—Pharm. Rund., 1893, 101.

What I know about Vaseline.—Luther F. Stevens considers the commercial side of this substance.—Amer. Drug. and Pharm. Rec., 1894, 312.

Russian Vaseline has lately appeared on the European market. According to Le Monde Pharmaceutique, it is a brown substance of ointment-like consistency. It is not adapted for pharmaceutical purposes, owing to the fact that it is not inodorous. The price is much less than that of the American product.—West. Drug., 1893, 326.

To Mix Vaseline and Water.—Van Goole states, in the Jour. de Pharm. d'Anvers, that the addition of a little castor oil to vaseline makes it miscible with water in all proportions.—Nat. Drug., 1894, 139.

To Mix Balsam of Peru and Vaseline.—Werner states that the addition of a few drops of alcohol or castor oil greatly facilitates the mixture of Peruvian balsam and vaseline.—Ibid.

Carbolic Vaseline, to be aseptic, should not be prepared only by mixing, but heated and kept at a temperature of 100 to 120° C., and the carbolic acid lastly added. This yet hot mixture is then transferred to hermetically previously sterilized and well closed cans, containers or tubes.—Pharm. Centralh., 1893, 671.

Danger of Use of Petrolatum as a Lubricator.—Novotny Memorabilien warns against the use of petrolatum as a lubricator for sounds and other instruments introduced into the bladder, as this substance has been found left behind in the bladder, serving as a nidus about which a mass of detritus had collected, and giving opportunity for the deposit of urinary sediments. In one case the quantity thus massed together upon a quantity of vaseline weighed 10 grains.—Drug. Circ., 1893.

Carbolic Acid Ointment.—Separation takes place only when the ingredients are mixed by rubbing them together, for when the solid carbolic acid is dissolved in melted paraffin or lard, even to the extent of 10 per cent., no such separation takes place.—Pharm. Jour. Trans., 1894, 1087; from Pharm. Zeit.

VINA.

Detection of Adulteration in Wines.—Marouby.—Test papers are prepared by soaking blotting-paper in the necessary reagents and drying. From the appearance of the spots caused by drops of wine on the various papers, it is possible to detect many sophistications, as is evidenced by a table given of the appearances of the centres, intermediate and exterior zones of the spots given by wines to which various foreign substances have been added. Foreign coloring matters generally show their effect more in the central and intermediate portions of the spots, the exterior zone being characteristic of the natural coloring matters of the wine.—Bull. Soc. Chim., 1893, 13.

Estimation of Alcohol in Wines.—A. Borntraeger dilutes 100 C.c. of the sample with an equal bulk of water, distils off two-thirds or more, dilutes the distillate to exactly 100 C.c., and takes its specific gravity at 15.5° C. Unless the sample contains more than 0.5 per cent. of volatile acidity, which is rarely the case, it is not necessary to neutralize before distillation.—Zeitschr. f. angew. Chem., 1894, 108.

U. S. P. Test for Alcoholic Strength of Wine.—L. E. Sayre calls attention to the methods of the Pharmacopœias of 1890 and 1880, and gives figures obtained by students in tests for the same.—West. Drug., 1894, 86.

Detection of Abrastol in Wine.—L. Briand. To 50 C.c. of wine put in a ¼ litre flask the author adds 1 C.c. pure sulphuric acid, agitates, and introduces into the mixture 25 Gm. of pure lead peroxide. After shaking energetically for five minutes it is thrown upon a filter moistened with water. He collects 40 C.c. of the filtrate, adds 1 C.c. of chloroform, and shakes again for a minute, when if the wine contains abrastol the chloroform takes up a yellow coloring matter. But with all natural wines the solvent remains perfectly colorless. If the yellow liquid from an abrastolized wine is evaporated, the residue, on treatment with a few drops of sulphuric acid, takes a splendid green color.—Compt. rend., cxviii, No. 17.

Chemical Action upon Wine by Naphthyl-Calcium Sulphate (Abrastol).—Scheurer-Kestner. A few Gm. of abrastol per litre are sufficient to prevent all secondary or posterior fermentation. The absence of cardiac and cerebral disturbances during the ingestion of abrastol, its rapid elimination in the urine and the remarkable toleration of the organism for this product, enable us to infer that this substance is unobjectionable for the preservation of wines. The detection of foreign substances in abrastolized wines may be effected as if the abrastol were not present. It is probable that abrastol may be advantageously substituted for plaster in the treatment of wines.—Compt. rend., cxviii, No. 2.

——— Abrastol may be detected to 1–40,000th part.—Ibid., No. 3.

Boric Acid in Wines, etc.—Kulisch (Zeitschr. f. Angew. Chem., 1894, 147). The solution should be as concentrated as possible, and needs only to be decidedly acid. The red coloration of turmeric paper is only decisive for B_2O_3 if it turns blue-black on treatment with alkaline solutions.

The presence of fixed alkaline chlorides is detrimental to delicacy of reaction, but this is obviated by the use of a little phosphoric acid along with the HCl.

Hydrogen Peroxide on the Coloring Matters of Artificial and Natural Wines.—When sodium peroxide is added to red wine, oxygen is evolved at a rate proportional to the acidity of the wine, and the color changes through dark maroon to pale yellow. Any precipitate produced by the liberated sodium hydroxide is easily soluble in acid. The time required to effect decolorization varies with the relative amount of sodium peroxide, from five minutes with 0.25 Gm. per 5 C.c., to five days with 0.01 Gm., whilst with 0.005 Gm. per 5 C.c., decolorization is incomplete after eight days. The process is slightly hastened by the addition of hydrochloric acid. The same results are obtained with a tartaric acid alcoholic solution of ænolin, the coloring matter of red wine. Aniline and azo-dyes, such as are used in the sophistication of wine, are not affected by the peroxide in acid solution, so that their presence in wine may be detected by treating it (5 C.c.) with sodium peroxide (0.1 to 0.15 Gm.) for 20 minutes, and then acidifying with acetic acid. If the color is not discharged, an artificial dye is present, and, since the natural coloring matter of the wine has been destroyed by the reagent, may be tested for in the usual way. Other vegetable coloring matters behave in the same way as the coloring matter of wine, and cannot be detected by this means.—Jour. Pharm. Chim., 1894, 17.

For Recognizing Artificial Coloring Matters in Wines.—The following process is given in Revue Vinicole, based on the property of a saponaceous solution of destroying the natural coloring matter of wine, while foreign colorants are not attacked: 5 C.c. of hydrometric solution are mixed with 5 C.c. distilled water, 5 to 10 drops of the wine to be examined added, and the tint of the liquid noted by transmitted light or against a white background. By this test natural wine gives only a slight grayish tint; fuchsine, intense rose-red; cochineal, red; hæmatoxylon, violet-red; hollyhock, bluish-green; red poppy, faint, pale brown; phytolacca, rose-violet; aniline violet, bluish-violet. The hydrometric solution employed must be of neutral reaction and must not contain a free alkali, since the latter would give the wine a green coloration, One Cgm. of colorant per litre of wine can be detected by this test.—Bull. de la Soc. de Pharm. de Bord., 1893, 175; Amer. Jour. Pharm., 1893, 454.

Estimation of the Dry Residue from Wine.—J. A. Muller describes a method of obtaining the residue by evaporation at 100° C. in a current of dry carbonic anhydride. From a series of experiments, the rates of desiccation for wines containing varying quantities of glycerol are deduced; hence the absolute residue at 100° C. may be calculated by subtracting from the residue, after twelve hours' desiccation, a quantity depending on the percentage of glycerol present and the quantity of wine taken for evaporation, provided that the residue is not much more than 0.1 Gm., and the desiccation is carried on exactly in accordance with the prescribed method.

When the dry residue is obtained by means of the vacuum desiccator, the loss of glycerol at 15° C. may be neglected, but a correction should be applied for loss near 30° C.—Bull. Soc. Chim., 1893, 6.

Determination of Extract in Wine is rapidly effected by evaporating 5 C.c. of wine in a tared watch-glass and drying it for thirty minutes in a water drying stove. Sweet wines must first be diluted to ten times their volume.—West. Drug., 1894, 402; from Zeitschr. f. Anal. Chem., 1893.

Glycerin in Wine—Determination of.—H. D. Paxton considers the methods of the Berlin Commission, even as modified by Barth and that of Lecco (Chem. Zeit., 1892, 504), to be deficient in that some glycerin is either lost or unextracted. He prefers the use of the Soxhlet apparatus.—Chem. News, 1894, 235.

Iron and Potassium Bitartrate in Wines.—From a series of analyses it is shown that various Italian wines contain from six to fifty milligrammes of ferric oxide to the liter. It is asserted that the wine from grapes grown upon the volcanic soils of Italy contain the most iron. These results are not of the importance which the Wiesbaden chemists appear to attach to them, as we take far more iron than this in our daily food. A more important question is that of the proportion of bitartrate of potash or cream of tartar contained in wines. This proportion varies considerably from one vineyard to another in all parts of Europe. Thus a quart of Burgundy of superior quality will yield two to three grammes of cream of tartar; Savoy wines, 3½ to 4½ grammes; Rhine wines, 2½ to 4½, etc. Generally speaking, the amount of cream of tartar oscillates between three and five grammes to the liter of wine. It has been found that green, unripe grapes contain much more tartrate than ripe grapes do, and the raw juice much more than the fermented liquor; the ordinary cheap wines yield more than the more esteemed qualities. It has been found that in general the weight of bitartrate of potash in a wine is equal to two or two and a half times the weight of the ash left by incinerating the residue left on evaporation of an unadulterated wine.—Van H. Roos in Rev. Internat. des Falsifications; West. Drug., 1894, 322.

Mannite in Wine and the Determination of Mannite.—Jégon has analyzed 9 samples, and concludes that the presence of mannite in wine is not an indication of falsification, but rather of defective fermentation.—Jour. Pharm. Chim., 1893, 103.

Mannitol in Wines—Formation of.—H. Malbot and A. Malbot. An historical introduction. The paper is to be continued.—Bull. Soc. Chim., 1894, 87.

Mannite in Wines—Formation of.—H. and A. Malbot. After having effected a rapid and complete fermentation of the must, the formation of mannite may be prevented, if required, by energetic sulphuring.—Bull. Soc. Chim. de Paris, xi.–xii., No. 9.

"Saccharin" in Wines and Beers—Detection of.—E. Spaeth. To detect saccharin in wines or cordials, the sample is mixed with purified sand, evaporated to about 10–20 C.c., acidified with a few C.c. of phosphoric acid, and extracted, at a gentle heat, with a mixture of equal parts of ether and light petroleum (b. p. 60°). After filtering through asbestos, the mass is again extracted until the filtrate measures about 200–250 C.c. After distilling off the solvent, the residue is taken up with a very weak solution of sodium carbonate and tasted. A sweet taste points to the presence of "saccharin," the amount of which may be ascertained, as usual, by a fusion with nitre and an estimation of the sulphate so produced. When applying the process to beers, the bitter principles of the hops must be first removed by adding a few crystals of copper nitrate. The liquid need not be filtered.—Zeitschr. f. angew. Chem., 1893, 579.

Estimation of Sugar in Wines.—J. Stern and P. Hirsch have found that, on adding sodium carbonate to a wine containing excess of lead acetate, the precipitated lead carbonate more or less redissolves in excess of the reagent, and that this is due solely to the presence of levulose. The excess of lead is, however, completely removed by a current of carbonic anhydride.—Zeitschr. f. angew. Chem., 1894, 116.

Wine Statistics of Germany.—Extensive statistics of the wine industry of Germany, including analyses.—Zeitschr. f. anal. Chem., 1893, 647–753.

Diseases of Wines.—Kayser, chief of the Fermentation Laboratories of the Agricultural Institute, considers the causes.—Bull. Soc. d'Encour. pour l'industr. nation; Jour. Pharm. Chim., 1894, 315.

Wines and Food.—A review of the progress in the examination of wines and foods for 1892.—E. List in Chem. Zeit., 1893, 951.

PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

ALABAMA.

Proceedings of the Twelfth Annual Meeting of the Alabama Pharmaceutical Association.—Held at Birmingham, May, 1893. The following papers were read:

A Suggestion Regarding the Class of Patent Medicines Used by Physicians.—J. W. Milner deems the remedy to be in education, and suggests that lecturers in medical colleges devote at least one lecture each year on the supremacy of "official materia medica" over the systems of nostrums, etc.

Should Druggists Do Counter-Prescribing?

The Morphine Question.—M. M. Stone suggests the formulating of some plan by which, in co-operation with the physician and the authorities, the evil may be lessened.

The Birmingham Druggists' Association.—G. B. McVay.

Business on Business Principles.—Wm. B. Parker. Reprinted in Merck's Market Report, 1893, 172.

Alabama Pharmacy Law.

Proceedings of the Thirteenth Annual Meeting of the Alabama Pharmaceutical Association.—Held at Anniston, May, 1894. The following papers were read:

Concerning the Laws of Chemical Combination.—A. T. K. Barber.

Chemical Urinary Analysis.—A review of the important tests for albumen, sugar, bile, urea, uric acid, urates, phosphates, chlorides and sulphates, by W. B. Parker.—Reprinted in Merck's Market Report, 1894, 151.

A. Ph. A. at Chicago.—A review by P. C. Candidus.

Pulv. Tragacanth Co.—W. F. Punch finds after several experiments that Pulv. Tragacanth Co. possesses a decided advantage over Pulv. Acacia, in combining with such substances as antikamnia, phenacetine, salol, antifebrin, chloralamid, bismuth salts, calcined magnesia and other heavy and light bodies that are insoluble in an emulsion.

How Can the Drug Business be made more Profitable?—E. E. Elam deems it necessary to be in touch with the times, push and profit.

The Best Method of Preparing Official Syrups.—An article especially directed to the keeping of the Syrups of Ipecac and Wild Cherry in warm climates. W. F. Punch prefers the use of granulated or crushed sugar in the quantity directed by the U. S. P. The water should be distilled or at least filtered. The syrup should be filtered cold rather than when hot. During the summer months he makes but small quantities, and adds glycerin to syrups of ipecac and glycyrrhiza.

Syrup of Wild Cherry can best be preserved in all its beauty of appearance and elegance of flavor, even in the hottest weather, when it is made strictly according to the *formula*, and in *no other* way, and by being put into pint or half-pint bottles, and kept in the coolest place in the store, and one will find that the last used will be as good as the first. This is a syrup that seldom gives any trouble in its combinations, if made after the U. S. P., but almost invariably does if made in any other way, and it is generally fated to be the most unsightly and disagreeable of any of the syrups in many of the drug stores of the day.

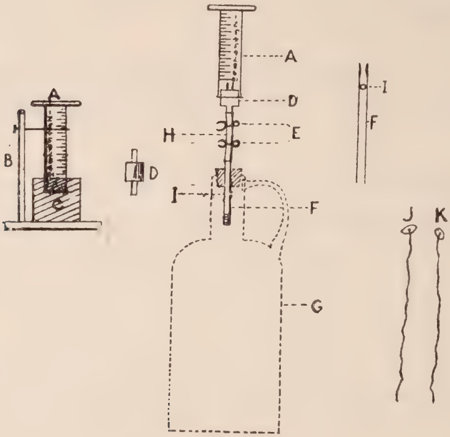
CALIFORNIA.

Report of the Twenty-first Annual Meeting of the California Pharma-

ceutical Society and College of Pharmacy.—Held at San Francisco, Dec., 1893. The following papers were read:

Estimation of Carbon Dioxide and Oxygen Contained in Gas in Demijohn when without the Convenience of Gas Apparatus.—F. T. Green.

FIG. 36.



A. Graduated cylinder 10 C.c. *B*. Stand or support for cylinder. *C*. Vessel filled with mercury. *D*. Cork and glass tube. *E*. Pinchcocks. *F*. Cork perforator, perforated near the top. *G*. Demijohn of gas. *H*. Rubber tubing for connection. *I*. Perforation in cork borers.

A small cork perforator of brass with the cap taken off (*F*) was first tapped by a small hole near the top (*I*), then joined by means of perforated cork and glass tubing (*D*) to rubber tubing (*H*) and pinchcocks (*E*) ready for action. The cylinder (*A*) was completely filled with mercury, likewise the whole system of tubing was filled with mercury and tip of cork perforator stopped.

The cork perforator (*F*) was then gently forced through cork of demijohn, the small hole (*I*) being kept closed with the finger. When the small hole had passed through the cork, both pinchcocks were opened and the demijohn jarred. The mercury began to fall, escaping into the demijohn through the small hole (*I*). The mercury in the cylinder being the heavier, it displaced the atmosphere in the demijohn. When the mercury fell to 10 C.c. both pinchcocks (*E*) were clipped on the rubber tubing (*H*). The cylinder held 10 C.c. of the gas. With scissors the rubber tubing was severed, and found to be filled with mercury as it should be. To submerge in mercury, and in such a position remove the pinchcock, rubber tubing and stopper (*D*), was a very patient and careful piece of work.

The Direct Estimation of Carbon Dioxide and Oxygen—Direct of Nitrogen.—The author uses the methods of Grandeau and Troost. Fastening a piece of moistened caustic potash on a fine, flexible platinum wire (Fig. 36) (*J*), it was slipped below the mercury into the neck of the cylinder (*A*); it floated to the top and the mercury could be seen creeping upwards and filling the cylinder. The potassium hydrate having a great absorptive power for carbon dioxide, it removed all the carbon dioxide present.

Mercury was added to the cup (*C*) from time to time, to take the place of that which rose into the cylinder to take the place of the absorbed carbon dioxide. When no further absorption took place, the wire was pulled, thus removing the stick of caustic potash. The readings from the cylinder were then taken, and the amount of carbon dioxide absorbed read.

With no eudiometer or extension pipette at hand, there was nothing to do but follow the same course of action in applying the reagent for oxygen absorption. A piece of filter paper moistened with a saturated solution of pyrogallol or pyrogallic acid, was introduced in a similar manner. It readily floated to the top, darkened, and the mercury rose again. The pyrogallic acid absorbed the oxygen, leaving the nitrogen only in the tube. The gas remaining after treatment with caustic potash contained a slight surplus of nitrogen.

Report of the Semi-Annual Meeting of the California Pharmaceutical Society and College of Pharmacy.—Held at San Francisco, May, 1894. The following papers were read:

Iodine Ointment.—S. A. McDonnel prepares it as follows:

Iodine	gr. iv.
Adipis	gr. xcvi.

Misce.

Place the lard on a water bath and apply heat until melted, then drop in the iodine and stir with stick or glass rod, when the iodine will soon be dissolved.

Dead Stock in a Drug Store.—W. M. Searby considers the "deadest" stock in the pharmacist's whole establishment to be in his tincture bottles.

Spirit of Nitrous Ether.—G. J. Harvey proposes a modification of the U. S. P process—the principal difference being that a larger amount of alcohol is intentionally used, the sulphuric acid being mixed with alcohol instead of with water, thus forming ethyl-sulphuric acid, a compound very readily decomposed on contact with sodium nitrite. The reaction proceeds without violence, nor is nitric oxide liberated. The distillate, while weaker in percentage of ethyl nitrite, is much larger in quantity, is neutral in reaction and free from aldehyd, and yields almost the theoretical quantity of ethyl nitrite without the necessity of washing.

The specific gravity of the present official spirit of nitrous ether is given as between .836 and .842, whereas the actual result, after repeated trial, shows only .8195. Comparison was also made by diluting the concentrated nitrous ethers of the market with alcohol to the proper strength. The products of all these proved to have a specific gravity of .8195.

The Druggists' Bogie Man.—C. M. Troffman criticises the physician's hand-writing.

Solution of Zinc Chloride.—H. E. D. Besthorn. The following formula will make the pharmacopœial quantity:

Zinc	240 Gm.
Hydrochloric acid	840 Gm.
Solution hydrogen peroxide	20 C. c.
Zinc carbonate prec.	16 Gm.
Distilled water	a sufficient quantity.

To the zinc, contained in a glass or porcelain vessel, add, gradually, the hydrochloric acid. When the solution is cold, strain, add the solution of hydrogen peroxide, let stand several hours, then add the zinc carbonate and heat on a water-bath about half an hour, then add sufficient distilled water to make the product weigh one thousand Gm., set it aside for twenty-four hours and filter through white paper.

Drescher recommended peroxide of hydrogen instead of nitric acid in making solution of ferric chloride, but the amount necessary would be objectionable on account of its cost.

Bismuth Sub-Gallate (Dermatol).—F. T. Greene considers the formula of the National Dispensatory defective, and proposes the following, which may be prepared of great purity, and at a cost of $3.00 per pound:

Normal bismuth nitrate	1 oz. av.
Glacial acetic acid	2 fl. oz. or q. s.
Gallic acid	250 grains.

Dissolve normal bismuth nitrate in the glacial acetic acid; add a pint of water. Bismuth salts should not precipitate; if so, add more glacial acetic acid till clear. Filter off impurities. Dissolve the gallic acid in a pint of warm water; mix the solutions; allow precipitate to subside; decant; wash by decantation with warm water until washings no longer react acid. Dry at 100° C.; rub to powder.

The following papers were presented (probably) before the May (1893) Meeting:

Syrup of Iron, Quinine and Strychnine.—S. A. McDonnel urges the following:

℞.	Ferri phosphatis (scales)	100 grs.
	Quininæ (alkaloid)	100 grs.
	Strychninæ	3 grs.
	Acidi phosphoric (50 per cent.)	1 fl. oz.
	Glycose (white, thick syrup) q. s. ad.	12 fl. oz.

M. Sec. art.

—Pacific Drug., 1893, 37.

Syrup of Phosphates of Iron, Quinine and Strychnine.—G. J. Hanvey employs an extemporaneous method for the preparation of the syrup in the following manner, the principle of which is to prepare an acid solution of the different salts, to be mixed with the syrup only at the time of dispensing. *Acid Solution.* 400 grains phosphate of iron, U. S. P.; 400 grains quinine; 12 grains strychnine; 4 fluidounces phosphoric acid; distilled water, q. s. to make 6 fluidounces. Dissolve the phosphate of iron in 1¼ fluidounces of hot distilled water, and when cold mix with the phosphoric acid. In this dissolve the alkaloids and then filter through white filter paper, adding sufficient distilled water through the filter to make the filtrate 6 fluidounces. *Syrup.* 40 ounces av. sugar; 19 fluidounces distilled water. Dissolve the sugar by the aid of heat in the water, filter through a pellet of absorbent cotton, and if necessary add sufficient distilled water to make 42 fluidounces. To prepare the official syrup, mix 60 minims of the acid solution with sufficient of the syrup to make one fluidounce.

The freshly precipitated ferrous phosphate was found to give even better results, therefore a formula for its use, conforming to the U. S. P. standard, is appended: 275 grains sulphate of iron (pure); 375 grains phosphate of sodium; 400 grains quinine; 12 grains strychnine; 4 fluidounces phosphoric acid; distilled water q. s. to make 6 fluidounces. Dissolve the sulphate of iron and phosphate of sodium each separately in 8 fluidounces of hot distilled water. When cooled to about 125° F., add the solution of the former salt gradually and constantly stirring to that of the latter. Collect and wash the precipitate in the usual manner, with the least possible exposure to light, and drain or express sufficiently to make the precipitate weigh about 1½ ounces av., and dissolve it in the phosphoric acid. If the measure is more than 5½ fluidounces, it may be gently evaporated over a water-bath until the proper measure has been obtained. In this dissolve the alkaloids, filter, and add sufficient distilled water through the filter to make the measure 6 fluidounces. This solution is to be used in the same proportion with the syrup as in the preceding formula for making the official syrup.—Pacific Drug., 1893, 37; Amer. Drug. and Pharm. Rec., 1893, 89.

Do You Ever Find Yourself Out of Salable Drugs?—S. A. McDonnel proposes a remedy.

Was the Water Distilled?—An experience which leads S. A. McDonnel to ask the source of the distilled water obtained in San Francisco.—Pacific Drug., 1893, 38.

Morphine Versus Ptomaines.—W. T. Wenzell is confident that no cadaver alkaloid will give all the reactions belonging to morphine, as stated below:

1. Morphine dissolves in cold concentrated sulphuric acid, forming a

colorless solution, which after standing several hours, turns pink on the addition of a trace of nitric acid.

2. A mixture of one part morphine and four parts of cane sugar added to concentrated sulphuric acid gives a dark-red color, which is intensified by a drop of bromine water.

3. A fragment of iodic acid added to a strong solution of a morphine salt is decomposed with liberation of iodine, which imparts a violet color to chloroform when shaking the latter with this mixture.

4. A strong neutral solution of ferric chloride causes a blue color with morphine; the color is changed to green by an excess of the reagent.

5. Neutral solutions of morphine produce yellow precipitates with chloride of gold or platinum, with potassium chromate and dichromate, but not with mercuric chloride.

6. Froehde's reagent (a freshly prepared solution of sodium molybdate, one milligramme in each C.c. of concentrated sulphuric acid) produces with morphine a magnificent violet color, changing to green.

The recent introduction of acetic ether for the separation of alkaloids in forensic analysis will no doubt prove an aid in the premises.—Reprinted in Pacific Drug., 1893, 23; Amer. Drug. and Pharm. Rec., 1893, 12.

Preparing Prescriptions for Societies—Does it Pay?—C. Troppmann has published a carefully preserved record, and comes to the conclusion that work for such societies are losses and does a druggist but little good.

How Sulphate of Morphine is Made.—J. Calvert. Opium in any quantity is exhausted with water. The resulting liquid is precipitated with an alkaline base, and crude morphine is the result. The crude morphine is taken up with sulphuric acid and water, filtered through animal charcoal and brought to a density of 4½° to 5° B. The crystallizing apparatus is a leaden tank, about six inches in depth, of any size to correspond with the amount of morphine sulphate. It is hinged on a frame and has an outlet, with a plug or faucet at the lower end for drainage. The solution being ready and the apparatus adjusted, the hot solution is run into the crystallizer.

The solution is stirred gently every few minutes until crystals commence to form on the surface, and then, carefully stirring, when the solution has come to the right temperature the morphine sulphate crystallizes suddenly into a solid mass.

The mass of crystals is allowed to repose for 48 hours, the plug at the lower end of the tank is removed and the mother liquor is allowed to run off, at first slowly, and afterwards by elevating the apparatus the last of the liquor is removed. The drainage requires several days.

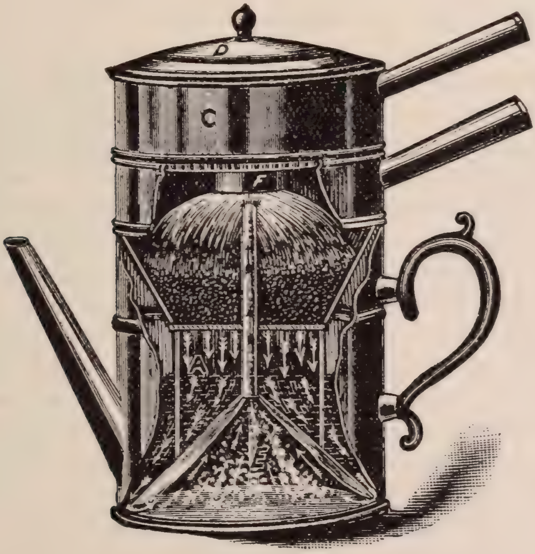
The crystals in the apparatus are then cut up into pieces of the shape of bricks (commencing at the upper end), which are placed on an absorbent, and removed to a drying-room.

In ordinary crystallization a certain part of the coloring matter is retained in the crystals. In this case, when the morphine is crystallized as described, and dried in bricks, nearly all the retained coloring matter comes to the surface, so that when the bricks come out of the drying-room the surfaces are brown, and in some cases almost black, showing that the coloring matter is eliminated. The next part of the process is to remove the colored part. This is effected by slicing off the dark portions, leaving the morphine sulphate perfectly white. The masses of crystals of sulphate of morphine (which have been heretofore described as bricks) are in a condition to be made into a merchantable article.

A very sharp knife and delicate hands will do it. The bricks are placed on a table and slices are cut off them (about ¼ inch each.) These slices are gently crumbled in the hands (very gently). Thus they will accommodate themselves to the capacity of the usual bottles of the trade.—Reported in Pacific Drug., 1893, June; Registered Pharm., 1893, 237.

Making of Decoctions.—S. F. Hughes recommends a pot which can be made of granite ironware. (See Fig. 37.)

FIG. 37.



Directions for Use.—Place the drug in the hopper, and the water in compartment *A;* then place on a stove, and when heated, menstruum will move up to *F* and flow through drug.

Quinine Tannate.—A. C. Zeig finds the alkaloid to vary 10 to 25 per cent. in commercial samples. For preparing the tannate from quinine alkaloid, the following may be recommended:

Quinine (alkaloid)	10 parts.
Tannic acid	30 "
Distilled water. q. s.	100 "

Triturate the quinine and tannic acid intimately in a mortar with the distilled water. Dry on a water-bath, at a temperature not exceeding 140° F., to a constant weight and powder. The resulting product, which is both neutral and tasteless, represents 25 per cent. of alkaloid quinine. By employing alcohol in place of water as a medium in which to effect combination, and spreading the concentrated solution of tannate on a glass plate, carefully avoiding iron spatula, allowing the alcohol to evaporate spontaneously, the product may be obtained in transparent, dark yellowish scales.

For preparing the compound from the more common form of quinine, namely, the sulphate, the following formula may be recommended:

Quinine sulphate	40 parts.
Sulphuric acid, dilute	40 "
Tannic acid	90 "
Sodium bicarbonate	10 "
Sodium acetate	10 "
Distilled water, q. s.	

Dissolve the quinine sulphate in 2,000 parts of distilled water with aid of the dilute sulphuric acid. Dissolve sodium bicarbonate and sodium acetate in another 2,000 parts of distilled water. When dissolved add to it the tannic acid, and triturate until complete solution is effected. Add the quinine sulphate solution to the tannic acid solution, stirring the mixture while it is being added. Set aside for six hours, stirring it at intervals, after which the precipitated tannate may be transferred to a wetted filter and washed. After draining, it should be dried between bibulous paper at a temperature not exceeding 140° F. The resulting tannate (about 50 to 55 parts) represents between 25 and 30 per cent. of anhydrous quinine alkaloid, equivalent to about 35 to 36 per cent. of the sulphate. Owing to incomplete combination taking place while the solutions are being mixed, it is quite important to let the mixture stand some hours before filtering. The bicarbonate and acetate of soda, although they do not enter the product, facilitate the combination as well as filtration to a large degree, and may therefore be regarded as a valuable adjunct to the process. It should be borne in mind, however, that on too long digestion or contact with water, partial or complete conversion of the tannate into the soluble gallate may result, in which instance the compound has a decided bitter taste; and furthermore, that when the compound is left in contact with saliva upon the tongue for some time a slight bitterness is perceptible, caused by the action of the alkaline saliva upon the same, while the bitter sensation of taste is altogether dependent upon the degree of alkalinity of the latter, thus varying in different individuals. While different observers have favored another water-insoluble compound of quinine, the eriodictyonate (from Yerba Santa resin), as being somewhat more soluble, satisfactory evidence can be presented that the so-called tannate is decomposed by the gastric secretions, with conversion of the quinine into a hydrochloride with a sufficient degree of promptness.—West. Drug., 1893, 362.

CONNECTICUT.

Proceedings of the Connecticut Pharmaceutical Association at the Eighteenth Annual Meeting.—Held in Hartford, Feb., 1894.

Report on the New Pharmacopœia.—A. F. Wood. A summary of the additions and the articles dismissed from the U. S. Pharmacopœia, 1890.

Report on the Progress of Pharmacy.—An addition to the Proceedings of the Connecticut Association, by A. F. Wood.

NORTH DAKOTA.

North Dakota Pharmaceutical Association.

Assay of Tinct. of Opium.—A. I. Widlund suggests the following method: The assay, as conducted upon the tincture in this instance, was modified so as to conform with the specific gravity of the liquid, which established a working basis equivalent to the percentage of opium represented in the tincture. One fluid ounce of the sample was weighed at 60° F., and evaporated upon a water-bath at about 194° F. to a thin syrupy consistence, and the whole transferred to a small Erlenmeyer flask. Assuming that the weight of one fluid ounce is 440 grains at 60° F., the following proportions were employed: To the contents of the flask add eleven grains of alcohol (sp. gr. 0.820) and about 132 grains of ether. Mix gently but thoroughly to avoid emulsification of the contents, then add eleven grains of ammonia (specific gravity, 0.935) and shake well to precipitate the alkaloid. Transfer the contents of the flask to a vacuum filter and precipitate all the adherent liquid to be drawn away, washing out the flask with morphinated spirits, and continue its use until the filtrate is colorless. Then wash in the same manner with morphinated spirits and continue its use until this is also colorless. Dry, slowly at first, finishing at 212° F. Transfer the dried substance to a mortar, reduce it to a very fine powder and digest it thoroughly in benzine to remove narcotine and such other alkaloids, other than morphine, which may be present. Transfer this to the vacuum filter and wash out the mortar carefully with benzine, which use to wash the powder carefully. This then will be morphine, free from other opium alkaloids, but still containing coloring and possibly other organic matter to the extent of 3 to 15 per cent. Dry and weigh this powder. Now ascertain the exact weight of crystallized morphine by titration with standard hydrochloric acid and litmus as the indicator. The acid is so made that 1,000 grains weight shall exactly neutralize 100 grains pure morphine crystallized from water, and washed with ether and gently dried finally at 212° F. This subjoined table denotes the results obtained from seven specimens of laudanum purchased in as many different sections of the state:

No. of Sample.	Weight of one fluid ounce at 60 degrees F.	Gross morphine weight in one fluid ounce.	Morphine net weight in one fluid ounce by titration.
No. 1	440	5¼ grains.	3.90 grains.
No. 2	437	2.60 grains.	2.10 grains.
No. 3	437	6.00 grains.	5.00 grains.
No. 4	439	4.25 grains.	3.90 grains.
No. 5	433	5.375 grains.	4.71 grains.
No. 6	440	4.375 grains.	3.45 grains.
No. 7	433½	4.55 grains.	4.15 grains.

—From Registered Pharmacist.

SOUTH DAKOTA.

Proceedings of the Eighth Annual Meeting of the South Dakota State Pharmaceutical Association.—Held at Yankton, Aug., 1893. The following papers were read:

Our Pharmacy Law—Is it as it should be?—J. H. Pettibone is impressed with its strength, completeness and clearly-worded sections.

To What Extent Can Qualitative Analysis be Practically Used.—C. F. Ayer gives a partial list of substances and preparations to which qualitative analysis may be applied.

To What Extent Can Pharmacists Counter-Prescribe Without Infringing upon the Rights of the Medical Profession?—John M'Clain.

Are the Medical Wines, as a Class, Satisfactory Pharmaceutical Preparations?—If Not, Suggest Improvement.—E. M. Coates believes that both wines and fluid extracts should be dropped, and that tinctures should be employed. The argument used is that every pharmacist is prepared to make them. It would also do away with two-thirds of the liquid shop bottles.

One Feature of the Pharmacy Law.—J. Lewis. "Many pharmacists take the erroneous position that pharmacy laws are made for the protection of the registered pharmacists and are demanded by them in their own behalf. The history of pharmacal legislation in this country, as well as the old countries, does not bear out this theory, but reveals the fact that legislation was demanded by the people for their own protection, in this profession as well as all others; and the people of any community *have* the right to demand protection from fraud and deception in every form, and no greater fraud can be perpetrated upon an innocent and confiding public than the dispensing of medicines and poisons and the compounding of physicians' prescriptions by incompetent and uneducated pharmacists.

"Pharmacy laws, therefore, being for the protection of the public, ought not the people of the state be willing to pay the expenses of maintaining a board of pharmacy created in their interest? To the state at large the expense would be a trifle, and would not be felt, and the pharmacist would be removed from the odium of paying an annual license fee as does the common auctioneer or the saloon-keeper.

"I think the pharmacists of the country are as much to blame for the direction legislation has taken as any one, and it is their duty to bring the subject before the people, aid in moulding public sentiment, and trust to our lawmakers and their sense of justice to place the profession of pharmacy on at least an equal footing with the 'horse doctor.'

"The change may be brought about slowly, and I would not counsel hasty action; but the subject is worthy of agitation, and by its adoption many of the objections against pharmacy laws now springing up all over the country would be removed, and an advance step taken that would soon be followed by every State in the land and endorsed by pharmacists of every country where pharmacy laws obtain."—West. Drug., 1893, 360.

Extemporaneous Pharmacy.—W. S. Branch says that he believes "a syrup freshly made from a reliable fluid extract, is far preferable to one made by the standards of the U. S. P., and then kept for weeks and often for months on the shelf of the dispenser," etc. Exceptions were taken to this stand by some of the members.

Substitution—Its Relation to the Health of the People and the Best Means of its Prevention.—J. C. Donaldson. The best means for its prevention may be:

1st. Physicians and pharmacists must recognize the United States Pharmacopœia and National Formulary as the standard.

2d. Physicians should write prescriptions only for recognized official preparations, or those of known composition and efficacy; place enough confidence in your dispenser to allow him to dispense any properly prepared pharmaceutical and official preparations he may have in stock, not compelling him to carry a large line of preparations from various manufacturers. If he cannot be trusted this far, he is not a competent person to compound your prescriptions.

3d. Druggists, use care and skill in making or selecting your preparations, and use only the best chemicals in your prescription work. Nevertheless, concede the physician's right to specify preparations of any particular make that he may see fit, as we cannot all think alike about these things. If you do not have in stock what is prescribed, never substitute another make without the prescriber's consent. So will the temptation for substitution be largely done away with.

To What Extent are the Pharmaceutical Journals of the U. S. Useful?—J. C. Donaldson considers every page of our pharmaceutical journals to be useful; every department, each and every article contained therein, is useful to some reader.

The State Pharmacy Law—Its Objects and the Duties of the Citizen in Relation Thereto.—C. F. Ayer.

Is Vaseline a Good Base for Ointments?—J. W. Brewer answers in the affirmative.

Report of the State Board of Pharmacy.

DELAWARE.

The Delaware Pharmaceutical Association held its Annual Meeting at Wilmington, May, 1893.

DENVER.

Denver Pharmaceutical Association.—

Compound Spirit of Thymol.—C. D. Lippincott proposes under this name a preparation as a substitute for listerine. His formula is as follows:

Benzoic acid	512 grs.
Sodium biborate	512 "
Boric acid	1024 "
Thymol	160 "
Eucalyptol	40 drops.
Oil of wintergreen	40 "
Oil of peppermint	24 "
Oil of white thyme	8 "
Alcohol (94 per cent.)	24 ozs.
Caramel	10 drops.
Distilled water sufficient to make 1 gallon.	

Dissolve the salts by the aid of heat in 48 ounces of the water; dissolve the thymol, eucalyptol and oils in the alcohol; mix the solutions; add the caramel, and water enough to bring to the required measure.

Let the mixture stand twenty-four hours, and finally pass through a wetted double filter.—Drug. Circ., 1894, 180.

GEORGIA.

Proceedings of the Eighteenth Annual Meeting of the Georgia Pharmaceutical Association.—Held in Rome, Aug., 1893. The following papers were read:

Is it Possible to Produce the Fluid Extracts of Such Strength that they can be Diluted with a Proper Menstruum to Make Standard Tinctures?—R. L. Tye reviews the history connected with their manufacture. As to the arguments for making tinctures from fluid extracts, as compared with those made from crude drugs: They are more reliable than those made from crude drugs, provided the fluid extracts emanate from a reliable source, because the crude drugs from which they are made are, in every instance, assayed, and, furthermore, the fluid extracts are manufactured from drugs which have been comparatively freshly gathered and the source of which is known to be authentic.

They are superior to crude drugs, the active principles being in solution, free from extraneous matter, and in compact form convenient for combination with any kind or proportion of menstruum or vehicle that the prescriber may choose to employ for each particular case.

Crude drugs are subject to deterioration by influence of air, moisture, and often insects, while in fluid extracts the menstruum, if properly selected, is capable of retaining in permanent solution the active medicinal principles, free from deleterious matter, and preserving them in a healthful state for an indefinite period.

On the other hand, tinctures made extemporaneously by druggists are generally made from crude drugs purchased through some jobbing house, who may have had them on their shelves for years, and the authenticity or strength of which the ordinary druggist has no means of ascertaining.

He may make his tinctures according to the most approved methods, and with absolute correctness, yet the product may be entirely inert, owing to the fact cited above.

Tinctures prepared from fluid extract are cheapest, for the reason that there is invariably a loss of alcohol in connection with the crude process which a retail druggist ordinarily uses to exhaust his drug.

A manufacturer, on the other hand, makes a saving in this direction, and taking also into consideration his superior advantages in the direction of the original crude drug purchases, is able to market his fluid extract cheaper than the druggist can possibly make it.

He concludes by saying that tinctures and wines possess, as a rule, no advantages not possessed by fluid extracts, and that they should, with perhaps a few exceptions, be eliminated from the pharmaceutical list.

Tinctures from Fluid Extracts.—J. W. England discusses this subject at considerable length (reprinted in the Amer. Jour. Pharm., 1893, 438). The following table of certain official tinctures, showing the strengths of menstrua for the tinctures and corresponding fluid extracts, is of interest:

Name of Drug.	Menstruum for Tincture.	Menstruum for Fluid Extract.
	(Parts.)	(Parts.)
Digitalis	A 1, W 1.	A 3, W 1.
Belladonna	A 1, W 1.	A.
Hyoscyamus	A 1, W 1.	A 3, W 1.
Stramonium	A 1, W 1.	A 3, W 1.
Rhubarb	A 1, W 1.	A 3, W 1.
Hydrastis	A 1, W 1.	A 3, W 1.
Serpentaria	A 1. W 1.	A 3, W 1.
Cubeb	A 1, W 1.	A.
Sanguinaria	A 2, W 1.	A.
Squill	A 1, W 1.	A.
Colchicum seed	A 1, W 1.	A 2, W 1.
Bitter orange peel	A 1, W 1.	A 2, W 1.

A, Alcohol. W, Water.

When we come to those drug tinctures having the same menstrua as corresponding fluid extracts, we should naturally expect, if perfect exhaustion of the same sample of drug has been had in both cases, that the drug-tincture and the extract-tincture would be equally representative of the drug. Theoretically this may be true, but practically it is a question as to whether it holds good as a rule. It may be the case in some few fluid extracts, but in others it certainly is not. Take valerian tincture for example: made by drug-exhaustion it is one thing, made by extract-dilution from a fluid extract of the same sample of drug, it is quite another thing.

But, it may be urged, what evidence is there that drug-tinctures are therapeutically superior to extract-tinctures? The best of evidence in such a matter is clinical evidence. Clinical experience confirms the view which practical pharmacy teaches—that a tincture made directly from a drug is stronger and better than a diluted fluid extract: no! it teaches more—it teaches that a properly made tincture is stronger relatively than a fluid extract made from the same drug, for the reason that the maximum doses of fluid extracts are in many cases, if not in all, relatively greater than those of tinctures. In other words, it requires more of the drug, relatively, as represented in a fluid extract, to produce its therapeutical effect, than it does of the drug as represented in a drug-tincture.

The following tables of official tinctures are of interest. The doses of fluid extracts are those given by four of the leading manufacturers of this country for their products. The products stated to be assayed are so marked. In some cases the maximum doses of these latter are less than those of the non-assayed products; in other cases they are more.

TABLE No. 1.

NAME OF DRUG.	Percentage of Drug in U. S. P. 1880 Tincture. (by weight.)	Percentage of Drug in U. S. P. Fluid Extract (by volume.)	Increased Strength of Fluid Extract in Drug. (Times.)	Dose of Tincture.	*Relative* Dose of Fluid Extract.	Dose of Fluid Extract of Manufacturer A.†	Dose of Fluid Extract of Manufacturer B.	Dose of Fluid Extract. of Manufacturer C.	Dose of Fluid Extract of Manufacturer D.	Average of Manu'f'r's' Maximum Doses.
Aconite root........	40	100	2.5	1–3 Min. (2–6 drops.)	⅖–1⅕ Min.	⅓–2 Min.	½–1 Min.	1–2 Min.	1–3 Min.†	2.0 Min.
Belladonna leaves ...	15	100*	6.6	5–20 Min.	¾–3 "	1–4 "	3–5 "	1–4 "	2–5 " †	4.5 "
Cannabis indica	20	100	5.0	5–30 "	1–6 "	2–8 "	2–5 "	2–5 "	1–3 " †	5.25 "
Cinchona	20	100	5.0	30–120 "	6–24 "	15–60 "	15–60 "	30–75 "	60–120 " †	78.75 "
Colchicum seed	15	100	6.6	10–60 "	1½–9 "	2–8 "	5–10 "	2–5 "	2–10 " †	8.25 "
Conium	15	100	6.6	15–60 "	2¼–9 "	5–20 "	2–5 "	2–10 "	3–10 "	11.25 "
Digitalis	15	100	6.6	5–30 "	¾–4½ "	1–4 "	2–5 "	4–15 "	2–5 "	7.25 "
Gelsemium	15	100	6.6	5–20 "	¾–3 "	1–6 "	5–10 "	4–15 "	1–3 "	8.5 "
Hyoscyamus	15	100	6.6	10–60 "	1½–9 "	4–10 "	5–10 "	5–10 "	5–10 "	10.0 "
Nux vomica	20	100	5.0	5–30 "	1–6 "	1–10 "	1–5 "	1–5 "	1–5 " †	6.25 "
Stramonium	10	100	10.0	10–30 "	1–3 "	1–4 "	1–3 "	1–3 "	1–3 " †	3.25 "
Veratrum viride	50	100	2.0	1–4 " (2–8 drops.)	½–2 "	½–2 "	2–4 "	2–5 "	2–4 "	3.75 "

* Not Official.

† Assayed Fluid Extract.

TABLE NO. 2.

NAME OF DRUG.	Percentage of Drug in U. S. P. 1880 Tincture. (by weight.)	Percentage of Drug in U. S. P. Fluid Extract. (by volume.)	Increased Strength of Fluid Extract in Drug. (Times.)	Dose of Tincture.	*Relative* Dose of Fluid Extract.	Dose of Fluid Extract of Manufacturer A.	Dose of Fluid Extract of Manufacturer B.	Dose of Fluid Extract of Manufacturer C.	Dose of Fluid Extract of Manufacturer D.	Average of Maximum Manufacturers' Doses.
Capsicum	5	100	20.0	10–60 Min.	½–3 Min.	5–15 Min.	5–10 Min.	3–5 Min.	1–5 Min.	10.0 Min.
Cimicifuga	20	100	5.0	60–120 "	12–24 "	15–60 "	10–30 "	8–30 "	30–60 "	50.0 "
Cubeb	10	100	10.0	30–120 "	3–12 "	10–20 "	15–20 "	30–120 "	10–30 "	47.5 "
Gentian (Comp.)	8	100*	12.5	60–240 "	4⅘–19⅕ "	10–40 "	30–60 "	60–120 "	30–60 "	70.0 "
Hops	20	100*	5.0	60–180 "	12–36 "	15–60 "	30–60 "	30–60 "	30–60 "	60.0 "
Hydrastis	20	100	5.0	30–60 "	6–12 "	10–30 "	10–30 "	15–60 "	10–30 "	37.5 "
Krameria	20	100	5.0	30–120 "	6–24 "	15–30 "	30–60 "	15–60 "	30–60 "	52.5 "
Lobelia	20	100	5.0	10–60 "	2–12 "	10–20 "	10–30 "	5–30 "	5–30 "	27.5 "
Matico	10	100	10.0	30–60 "	3–6 "	15–60 "	30–60 "	30–60 "	30–60 "	60.0 "
Quassia	10	100	10.0	30–60 "	3–6 "	5–15 "	30–60 "	30–60 "	30–60 "	48.75 "
Serpentaria	10	100	10.0	60–240 "	6–24 "	15–30 "	30–60 "	30–60 "	30–60 "	52.5 "
Sumbul	10	100*	10.0	15–60 "	1½–6 "	10–30 "	15–60 "	15–60 "	15–60 "	52.5 "
Valerian	20	100	5.0	30–180 "	6–36 "	30–60 "	15–30 "	30–150 "	15–30 "	67.5 "
Zingiberis	20	100	5.0	30–120 "	6–24 "	5–20 "	5–40 "	5–30 "	5–40 "	32.5 "

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* Not official.

Examination of these tables shows marked differences between the relative maximum doses of fluid extracts and those given by the manufacturers of their products; and it should be noted that the manufacturers named fairly agree, in many cases, as to maximum doses.

If the contention that representative tinctures of drugs can be properly made by diluting fluid extracts be true, it logically follows that the relative dose of a given tincture and fluid extract should be identical. If the 10 per cent. tincture of drug *A* has the dose of sixty minims, the 100 per cent. fluid extract of drug *A* should have the dose of six minims, the difference between the official per cent. by weight for tinctures, and per cent. by volume for fluid extract making no material difference. The dose of cinchona tincture being 30 to 120 minims, the dose of the fluid extract (being about five times as strong) should be one-fifth or 6 to 24 minims; yet we find the dose usually given is from 15 to 60 minims.

If dose is any criterion of drug-strength at all, it follows that the dose of tincture and fluid extract should be relatively the same, if the latter is to be diluted to make the former; otherwise there must be a certain difference between the proportion and the kinds of proximate principles in the drug-tincture, as compared with the extract-tincture. Practically, it seems impossible, save in some few cases, to obtain fluid extracts which will have the same relative dose as the drug-tincture, for the actual dose of a fluid extract is not of necessity its relative dose compared with the dose of the tincture; and if this be so, the making of representative tinctures from fluid extracts is impossible. Manufacturers of fluid extracts are not to be blamed for this; it is a condition of drug-exhaustion over which they have no control. In the making of fluid extracts, manufacturers may exhaust a drug of all its soluble proximate principles, obtaining them in solution, but on storing the fluid extract for a time before selling, which is always done (or if it is not done, the fluid extract precipitates afterwards), the product invariably yields, through certain changes, precipitates of proximate principles more or less voluminous in character, and more or less valuable therapeutically. These are removed by decantation and filtration by the manufacturer before the product is sold.

It does not follow that fluid extracts so treated are necessarily inferior; they may be of excellent quality for fluid extracts, but they are not relatively as strong as drug-tinctures. It is clearly unreasonable to claim that the same tincture can be had by extract-dilution as by drug-exhaustion, when more or less of the proximate principles of the drug have been removed from the fluid extract used for dilution.

It is a mistaken belief to suppose that a definite relation exists between the tincture and the fluid extract in the amount of drug represented; that, for example, a 100 per cent. fluid extract represents five times as much drug as a corresponding twenty per cent. tincture. A due allowance must be made for the removal, by the maker, of proximate principles precipitated by the fluid extracts; admitting the possibility of the concentration in fluid extracts of all the soluble principles of drugs. Hence, under the best conditions, the making of tinctures by diluting fluid extracts cannot yield products equally representative with drug-tinctures, unless perfect exhaustion of drugs be had in making the fluid extracts, and proper allowances be made for the character and amount of proximate principles separated from them; and this latter, from its variability, is out of the question.

It is in evidence, that fluid extracts and tinctures have distinct therapeutic fields; that they vary from each other in the relative proportions, and, in some cases, in the kinds of proximate principles represented, and that fluid extracts diluted in the usual way cannot, of very necessity, be the same things, therapeutically, as tinctures made from superior qualities of drugs.

The practice of using fluid extracts, assayed or not, for making tinctures, should be condemned, as inimical to the best interests of legitimate medicine and pharmacy. Only through the use of superior drugs and the making of his own tinctures according to official methods, can the pharmacist know the quality of his preparations. How can he vouch for the quality of a drug after it has been made up into a preparation, if somebody else has made it?

So, as regards the preparation of tinctures, the only right practice for the pharmacist lies in his buying the best quality of drugs, and making his own preparations. In this way there is safety—safety for the doctor who prescribes, the druggist who dispenses, and last, but most important of all, the patient who swallows the medicine.

Making and Coating Glycerin Suppositories.—C. S. Bondurant recommends:

Sodium carbonate in crystals	1 part.
Stearic acid (dry)	2 parts.
Glycerin	32 "

Powder sodium carbonate and stearic acid finely, mix with the glycerin in an evaporating dish, place on a water bath, and continue heat until effervescence ceases, and complete solution is effected.

Pour into cold dry moulds, and, when congealed, cut off, and insert into one end a long needle, dip quick into melted paraffin for an instant, cool quickly, take out the needle, stop the hole by gentle pressure, and keep in glass-stoppered bottles.

Substitution: Its Relation to the Health of the People and Best Means for Its Prevention.—H. R. Slack believes in education in medical colleges.

Baking Powders and What Compose Them.—G. F. Payne has made a number of analyses, and publishes the same.—Reprinted also in The Registered Pharm., 1894, 5.

Baking Powder Recipes and Suggestions.—G. F. Payne.

ILLINOIS.

Proceedings of the Illinois Pharmaceutical Association for 1893 will be incorporated with the Proceedings for 1894 and published in one report.

Gun Cotton—Preparation of.—J. G. Flints finds that by the process given 5 ounces will make as much collodion as 8 ounces prepared according to the U. S. P.

He used a mixture consisting of twelve parts of concentrated sulphuric acid, six parts of concentrated nitric acid, and one part of absorbent cotton. In working with these proportions observe closely the following directions: Pour the sulphuric acid into an open stone jar in which the nitric acid has previously been placed. When the temperature has fallen to about 35° C., place the jar in a larger vessel and surround it with broken ice. Allow the temperature to fall to 15° C. Then take the cotton, a small portion at a time, and, having carefully loosened up any compact masses, lay it carefully on the surface of the acid and with a clean glass rod press it below the surface. Keep the thermometer in the acid and watch the temperature closely. Continue the additions of cotton until all is under the acid. If at any time the temperature rises above 16.5° or 17° C. stop the additions of cotton till the thermometer registers 15° again. Allow the jar to remain in the ice without cover for about five hours. Now drain off as much of the acid as possible, using a glass rod to press it out. When, as near as possible, all the acid has been removed, protect the hands with rubber gloves and take up the cotton in small portions and wash it quickly in a large vessel of cold water. As soon as the cotton reaches the water, move it about quickly and pull it apart to prevent too great an elevation of temperature. Wash in several portions of cold water. Wring out well and spread on clean boards or paper to dry.

Do not rinse in hot water or dry by artificial heat. This will greatly injure, if not completely spoil the product if done. As soon as dry, the cotton is ready for use, and if the above directions have been observed faithfully, it will be all that can be desired. If any portion is to be kept for future use, place it in an open jar and cover with distilled water. Cover the jar loosely. Do not keep in a tightly closed container; it will make trouble.—Registered Pharm., 1893, 225.

INDIANA.

Owing to funds being exhausted by failure of banks, the Indiana Pharmaceutical Association will not issue a report for 1893.

The Proper Dispensing of Dry Powders in Capsules.—The query box was opened. The first query was: "In making capsules of antikamnia, what is the usual process?" The following answers were given:

President Carter: It is the usual custom to put the medicine into the capsule dry, and thereby have a coating of it on the outside, making a very slovenly and unsightly appearing capsule. (He reviewed at some length Dr. Perry's article on capsules, fully agreeing with the doctor that care enough was not taken to have everything as neat as it should be.)

Mr. Ridgely: Puts up the dry powder and weighs the capsule each time.

Mr. Kennedy: Advises making a pill-mass before putting in capsules.

Mr. Wolcott: In every instance the article called for by the prescription should be used, and no substitute allowed. You cannot use something in place of antikamnia that will "answer as well," and you should not if you could.

Mr. Haynie: Thinks the substance should be put in the capsules dry, as the dry powder has a better and quicker effect. Evansville druggists all dispense dry.

Mr. Hereth: The use of dry powders is advisable in most cases. The druggist should use only and exactly what the doctor orders.

In commenting upon the above it is pleasant to note that Messrs. Walcott and Hereth deemed it appropriate, even though the point was not involved in the query, to lay great stress upon the preservation of the integrity of the drug, and from our report of the proceedings no sentiment met with more cordial and enthusiastic approval than the slogan "no substitution." Upon the exact point of the query our experience agrees fully with that taken by the majority of the Association, that quinine, cinchonidia, as well as antikamnia, and indeed all powdered drugs wanted in capsules, are best put up in the dry powder, as the effect is more speedy and appreciable.

The objection cited by President Carter is readily overcome by the practice of using a clean, dry towel in the handling of the finished capsule, wiping each one separately.—Notes on New Pharm. Products, July, 1893; National Drug., 1893, 35; Pacific Drug., Aug. 20, 1893.

IOWA.

Iowa Pharmaceutical Association.

Wine of Pepsin.—Conrad Schadt finds the albumen-dissolving capacity of wine of pepsin to be for 25 minims of wine, diluted with 475 parts of water acidulated water, equal to 50 grains or more of coagulated albumen.—Iowa Pharm. Assoc. Proc., 1893; reprinted in West. Drug., 1894, 93.

Ustilago Maydis.—A. Falkenhiner. The following is a list showing the most reliable results of recent analysis: One hundred parts of the drug contain: Moisture, 9 parts; sand, 4 parts; ash, 5 parts. (1) Extracted by carbon disulphide is a crystalline principle of unknown properties; (2) by ether, an alkaloid probably identical with secaline; (3) by water, a volatile base with an acid reaction and claimed to be sclerotic acid, albuminoid matter, sugar, mucilage, cellulose, starch isomers, and fixed oil 2.5 per cent. (acid reaction). The substances which seem most likely to have medicinal effects are the fixed oil, the amine-like volatile substance extracted by ether, and the so-called sclerotic acid extracted by water after all the other extractives have been used. The activity of the drug is probably due to a combination of acids, alkaloids and oils, and not to any one constituent, for as yet no principle of ustilago has been extracted which fully represents the activity of the drug. As for the physical properties of the drug, they have, like its constituents, not been satisfactorily determined. Compared to ergot, it seems to have various advantages in not producing irregular contractions, containing but 2.5 per cent. oil (whereas ergot contains 25–30 per cent.), the dangers of absorption thus being reduced to a minimum, and finally in being procurable at a cost of 75 per cent. less than that of ergot.—West. Drug., 1894, 88.

KANSAS.

Proceedings of the Fifteenth Annual Meeting of the Kansas Pharmaceutical Association.—Held at Salina, May, 1894. The following papers were read:

Adulterations.—L. E. Sayre examined a caramel paste, used for making chocolate caramels, etc. It contained:

Glucose	53.69	per cent.
Lactose	7.10	"
Starch (wheat)	22.66	"
Fat	4.46	"
Casein	2.98	"
Water	9.20	"
Albumen, principally.		

Pharmacy and New Remedies.—M. O. Miner. The tabulated list increased to 2000, and it is the desire on the part of some of the members to publish the list in the form of a table.

What is the Best Plan to Secure and Keep Employed Assistants, and What Wages Should they Receive?—B. W. Woodward.

To What Extent Can Pharmacists Profitably Make their Preparations?—E. C. Fritsche.

To What Extent Should this Association Investigate the Qualifications of the Prospective Candidate for the State Board of Pharmacy.—F. F. Yoe.

Standardization of Drugs.—Steinberger and Reynolds estimated the per cent. of alkaloid in the fluid extract of nux vomica, belladonna and aconite, stramonium and colchicum.

Weigh out a certain amount of the fluid extract; dilute it, and add ammonia water, until the alcohol, water and ammonia water are present in the proportion of 4 volumes of water to 2 volumes of alcohol, and 1 volume of ammonia water. Transfer the mixture to a separating funnel, add chloroform and agitate by rotating the funnel, then draw off the chloroform and repeat the operation until all of the alkaloid has been extracted. Evaporate the chloroformic extract thus obtained to dryness on a water-bath of rather low temperature. Dissolve the residue in a definite amount of N-10 hydrochloric acid and titrate with N-10 potassium hydrate, using Brazil-wood as indicator.

In each case they made two determinations, from which they obtained the same results. In drugs containing more than one alkaloid they used the mean of the molecular weights of the alkaloids, assuming that they are present in equal proportions, as for example, nux vomica, in which the molecular weights of the alkaloids strychnine and brucine are respectively 334 and 394; therefore the molecular weight used was 364, or the mean of the two.

They found by titrating the amount of hydrochloric acid used to unite with the alkaloids present to form their hydrochlorides, and as for 36.37 Gm. of hydrochloric acid used there must be present an amount of alkaloid equivalent in grams to the molecular weight, calculations now must be to determine to how much alkaloid in grams 1 C.c. of decinormal hydrochloric acid is equivalent. This is as follows:

100 C.c. of normal hydrochloric acid contain 36.37 Gm. of hydrochloric acid. 1 C.c. of normal hydrochloric acid would contain 0.03637 Gm. of hydrochloric acid. 1 C.c. of decinormal hydrochloric acid would contain 0.003637 Gm. of hydrochloric acid. But 36.37 Gm. of hydrochloric acid will neutralize and are equivalent to 364 Gm. of nux vomica alkaloids, or 289 Gm. of mydriatic alkaloids; so, 100 C.c. normal hydrochloric acid are equivalent to 364 Gm. of nux vomica alkaloids, or 289 Gm. of mydriatic alkaloids, and 1 C.c. of decinormal hydrochloric acid is equivalent to 0.0364 Gm. of nux vomica alkaloids, or 0.0289 Gm. of mydriatic alkaloids.

In this way we know the equivalent of 1 C.c. of decinormal hydrochloric acid for every alkaloid or mixture of alkaloids, and can, from the number of C.c. of hydrochloric acid used, calculate the amount of alkaloids present and have the percentage of alkaloid.

The authors give their results, and conclude that the titration method for the standardization of drugs is the best method now in use.

Better methods for extracting the alkaloids from the fluid extracts may be used in some cases, but it is yet to be decided which method is best suited to each drug.

A method for the estimation, by titration, of the amount of alkaloid in any salt of an alkaloid, has been introduced in some countries. On trial, we find this to be an excellent method. The method is to weigh out a certain amount of the salt to be tested, dissolve it in water, making sure that the acid is in excess; then titrate it with decinormal KOH, using Brazil-wood as an indicator, and by so doing determine the amount of acid in the solution in excess. Now weigh out an equal amount of the salt, dissolve it in water and again titrate with decinormal potassium hydrate, using phenolphthalein as indicator, and by so doing determine the amount of acid present, both free and combined. Now, the difference between the free acid (which was determined by the use of the Brazil-wood indicator) and the total amount of acid present (determined by the use of the phenolphthalein indicator), is the amount of the combined acid, and by the use of the molecular weights of the acid and of the alkaloid the amount of alkaloid present can be determined. The following are the calculations and results of their experiments:

They took of quinine alkaloid, .09174 Gm., and to this added 10 C.c. of decinormal HCl, titrated this with decinormal potassium hydrate, (using Brazil-wood as an indicator), and found present 7.9 C.c. of free hydrochloric acid; then took another portion of the alkaloid, added 10 C.c. of decinormal hydrochloric acid as before, and titrated with decinormal potassium hydrate (using phenolphthalein as indicator), and it showed the presence of the acid added (10 C.c.).

They tried the same experiment with colchicine, and found it to act in the same way. There are a few alkaloids that are inactive or very weakly acting, and in these the alkaloid cannot be estimated as above stated, owing to their inactivity toward acid. The alkaloids with which they experimented were hydrastine and caffeine. The former was entirely inactive, and the latter so weakly acting that it was impossible to obtain accurate results by this method.

Acetanilid—Its Purity and Compatibility with other Substances.—C. E. Haller experimented with the following mixtures:

1. Acetanilid 2 parts, sodium bicarbonate 7 parts; no decomposition.

2. Acetanilid 2, ammonium bromide 1, salicylic acid 1. A change took place at the end of 35 minutes, the mixture turning a pink color.

3. Acetanilid 58, sodium salicylate 43. At the end of two hours the mixture turned faintly brown, but the color was not as noticeable as in the preceding experiment.

4. Acetanilid 10, calomel 1; no decomposition.

5. Acetanilid 1, potassium chlorate 1; no decomposition.

6. Acetanilid 1, sp. nitrous ether 8, water 20; no decomposition. Nor was there any change even when mixed in the proportion of acetanilid 1 to sp. nitrous ether (not diluted) 10.

All the above mixtures were heated up to about 90 degrees C. and kept at that temperature for thirty minutes to ascertain if any that were not affected before would be decomposed now. He found that they remained unchanged, with the exception of ether mixtures, and they turned to a brownish color in both cases. The changes which took place in the second and third experiments are probably due to the salicylic acid present. With chloral hydrate and acetanilid, on trituration, an oily, sticky mass was obtained.

Colorless Fluid Hydrastis.—B. D. Woodward examined six commercial samples with the following results:

Solution No. 1 had a specific gravity of 1.1181, and contained five per cent. of alcohol. In 20 C.c. of the solution he found .4 Gm. of the white alkaloid hydrastine and .035 Gm. mineral salts. Found also 41 per cent. of glycerin in this extract, and it tested for boric acid quite decidedly; was present in some quantity. The precipitate from this preparation separated in well defined acicular crystals.

Solution No. 2. This solution had a specific gravity of 1.1472, and contained 6 per cent. of alcohol; in 20 C.c. of the preparation there was .09 Gm. of hydrastine present, and .14 Gm. of mineral salts. Found 39.5 per cent. of glycerin also to be present in the extract, and of boric acid there seemed to be quite a small quantity.

Solution No. 3 had a specific gravity of 1.0599, contained 12 per cent. of alcohol, and in 20 C.c. of solution, .053 Gm. of hydrastine, .086 Gm. of mineral salts, and 38 per cent. of glycerin were present. Boric acid occurred in small quantities in this preparation.

Solution No. 4. Specific gravity, 1.1039; alcohol present, 9 per cent.; .092 Gm. of hydrastine and .073 Gm. mineral salts were represented in 20 C.c. of the solution, and the percentage of glycerin was found to be 25 per cent. No boric acid was found in this extract by testing, and as it takes only a drop of the reagent to give the reaction, none was considered present.

Solution No. 5. Specific gravity, 1.0901; contained 12½ per cent. of alcohol, and in 20 C.c. of the same solution were found .099 Gm. of hydrastine, .256 Gm. mineral salts, and about 40 per cent. of glycerin. No boric acid was found in this extract, but it had a very thick precipitate and dried pasty.

Solution No. 6. Specific gravity, 1.1178; alcohol, 14 per cent. in 20 C.c. of solution, .025 Gm. of hydrastine, .022 Gm. of mineral salts, and 41 per cent. of glycerin, and no boric acid, were found to be present.

These crystals were all proven without a doubt to be the white alkaloid hydrastine in all the preparations.

Pepsin and its Preparations.—A comparison of the various kinds found in the market.—H. C. Hogeboom.

A Good Microscope.—L. E. Sayre.

Insects Injuring Drugs.—V. L. Kellogg and L. E. Sayre continue their studies:

The most abundant, and probably most injurious of the drug insects, is *Sitrodrepa panice*, Linn., a small brown beetle of the family Ptinidæ, which was found attacking forty-four different drugs, among them cantharides, blue flag, aconite, ginger, comfrey, Indian turnip, powdered coffee, wormwood, etc. The cantharides were badly riddled and broken by the pests.

Lasioderma serricorne, Fab., of the family Ptinidæ, another small brown beetle, was found in powdered ergot.

Ptinus brunneus, Duf., another member of the Ptinid family, was found attacking musk root, powdered senna leaves, and powdered jaborandi leaves.

Silvanus surinamensis, Linn., the lesser grain beetle, was found in almond meal.

Silvanus advena, Walt., another species of the same genus as the last named pest, was found attacking aconite. Still another species of *Silvanus* was found in aconite, ginseng, henbane leaves, and senega root.

Tenebrio obscurus, Fab., a large black beetle, closely related to the well-known meal-worm beetle, was found attacking parsley root.

Anthrehus varius, Fab., a beetle of the same genus as the common Buffalo Bug of the house, was found in powdered cramp bark.

Atropos divinataria, Fab., the book-louse, was found to be infesting henbane leaves and golden seal.

Sepisma saccharina, Linn., the "fish moth," was found attacking powdered mezereum bark, and Socotrine aloes.

The remedy for all these pests, other than preventing the ingress of the insects by using tight jars and canisters, is to expose the infested drugs in a tight vessel to the vapor of carbon bisulphide.

Syrup of Iodide of Iron—Extemporaneous Preparation of.—A. Worthrup prepares the following:

Iodine	480 grs. (?)
Distilled water	2½ fl. oz.
Iron by hydrogen	150 grs.
Citric acid	10 grs.
Syrup sufficient to make	10 fl. oz.

Place the iodine in a flask, add the distilled water and reduced iron in small quantities. Care should be taken not to add too much iron at a time after the reaction has begun, which can be perceived by the violet color of the liquid; also by the increase of temperature. The reaction is to be continued until the violet color has changed to a green. A slight excess of iron may be added after the reaction has ceased, as it serves to prevent the oxidation during filtration. The syrup should be heated to near the boiling point and the solution of ferrous iodide filtered into the hot syrup. Then make a 50 per cent. solution of citric acid and add to the finished product. The citric acid tends to prevent the liberation of free iodine. The advantages of this formula are the rapidity in the preparation, which requires from fifteen to twenty minutes, the ease of manipulation, besides the additional advantage that it can be kept in pint or quart bottles from which a part can be dispensed without injury to the remainder of the preparation.

Do the Semi-Proprietary Preparations afford the Druggist a Paying Profit, considering the Qualifications as Required by Law?—C. Lawrence says fairly well.

Does Pharmacy Present any Advantage for Men over that of Women?—M. O. Miner presents a paper—Pharmacy presents no advantage for men. Mr. Geo. E. Dyck one on—Women cannot conduct pharmacies.

An Analysis of Cocoanut.—Henry Ernst obtained about 70 per cent. of a fixed oil, which examined under the microscope is crystalline. It crystallizes in fine acicular crystals when solid or cold.

Adulterated Wax.—Percy B. Barter reviews the tests, and found a sample to contain 84 per cent. paraffin, 2.2 per cent. cerolin (coloring matter) and 13.8 per cent. pure wax.

Albumen, Sugar and Urea in Urinanalysis.—L. E. Sayre employs the following method for the quantitative determination of albumen: "Acidify 100 C.c. of clear albuminous urine with acetic acid; heat to the boiling point in a water-bath for half an hour, and filter through a small filter, previously dried at 110 degrees C. and weighed; wash with boiling water to which a little ammonia water has been added (to remove uric acid and urates), then with pure water until the filtrate is not rendered turbid any longer by silver nitrate, next with pure alcohol, and finally with ether. Filter and dry at 110° C. and weigh. As it may happen that the precipitated albumen encloses earthy phosphates, it is well to burn filter with contents in a platinum crucible, and to deduct the weight of the remaining inorganic residue (less the weight of the filter ash) from that of the albumen. This incineration however may be omitted in ordinary cases."

For sugar—Gerard's cyano-cupric test in quantitative estimation has yielded the author accurate results. For urea estimation the author refers to the apparatus made by Parke, Davis and Co., and the Doremus apparatus. He considers the use of sodium hypo-bromite solution far superior to the hypochlorite solution.

50 per cent. Tinctures.—C. L. Bly (under the direction of L. E. Sayre) from experiments concludes that the manufacture of 20 per cent. tinctures by simply percolating the drug with 200 per cent. of menstruum is practically impossible. Undoubtedly the major portion of the medicinal constituents would be dissolved if the operations be carefully conducted; but as the drug is not exhausted by using this portton of menstruum, even in skillful hands, it does not seem safe to recognize this class of preparations made in this way by a promiscuous class of operators such as is found composing the drug trade.

Elixirs.—C. E. Joslin gives formulas for solixir bismuthi, solixir strychninæ, solixir ferri phosphatum. The idea contained in these preparations is to have the medicaments used in a concentrated form. These preparations can be of such strength and condition as to make any standard elixir by simply mixing certain quantities of the *solixir* and sufficient quantity of the proper aromatic elixir.

The following formula for elixir of taraxacum and yerba santa is given:

Pumice powder	½ oz.
Syrup	8 fl. oz.
Comp. elixir of taraxacum	8 fl. oz.

Mix and agitate until the powder is thoroughly mixed; then add, with a continuous agitation,

Fld. ext. yerba santa	1 fl. oz.

Mix and shake occasionally for a few hours, and allow to settle; decant through absorbent cotton, adding the dregs last. To the finished strained product, contained in a bottle, add:

Magnesium carbonate	80 grs.

Mix and shake; let stand over night, filter, adding bottom stratum last, and comp. elixir of taraxacum, q. s., to make 16 fl. oz.

One great advantage of this elixir is that it improves with age; samples two years of age are said to be better than fresh ones. A proportion of 5 gr. sulphate of quinine and 1 fl. dr. of elixir, using no acid or diluent, so completely disguised the bitter taste of quinine that scarcely any one could detect it in solution. Also a test of 6, 8, 10, and 12 grains to the fl. dr. of elixir, excellently covered the bitter taste of the alkaloid up to 12 gr. in the fl. dr. of the elixir. In the College of Pharmacy, New York, over sixty sample trials of different mixtures were tested for disguising the taste of quinine, the one ranking first being as follows:

Comp. elixir of taraxacum,	
Syrup	āā 2 fl. oz.
Fld. ext. yerba santa, double strength	1 fl. dr.
Powdered pumice	60 grs.

Mix, agitate, let stand to subside, and decant through cotton.

Acetic Acid as a Menstruum.—J. E. McMahon suggests the use of a stronger acetic acid, say 15–18 per cent. He has made out a comparison table as follows from experiments:

Fluid Extract used.	Menstruum.	Wt. of Drug.	Total Extractive.		Total Alkaloids.		Inert Matter.	
		Gm.	per ct.	Gm.	pr. ct.	Gm.	pr. ct.	Gm.
Nux Vomica.....	Official......	10	13.18	1.318	9.464	——	3.716	1.858
Nux Vomica....	Acet. acid 10 per ct.	10	8.9	.89	7.02	——	1.88	.94
Calumba.........	Official	10	1.63	1.63	7.2	.72	7.2	.72
Calumba.........	Acet. acid 10 per ct.	10	.78	.78	4.2	.42	4.2	.42
Calumba.........	Acet. acid 36 per ct.	10	1.82	1.82	8.6	.86	8.6	.86

Uniformity in Dispensing Prescriptions in Capsules is Desired.—Is it best to make a mass when not specified, in dispensing prescriptions for powders to be enclosed in capsules? What is the general custom? Replies from leading pharmacists in the U. S.

KENTUCKY.

Proceedings of the Kentucky Pharmaceutical Association.—16th Annual Meeting, held at Louisville, May, 1893. The following papers were read:

Comparative Value of Alexandria and Tinnivelly Senna.—O. C. Dilly.

In summing up the results from the comparative estimation of cathartic acid in a number of samples of both varieties, the Alexandria appeared in a more favorable light than the Tinnivelly.

The average yield of cathartic acid from Alexandria senna was 0.9 per cent.; that from the Tinnivelly variety, 0.6 per cent.—a difference of 0.3 per cent., or one-third less. This difference was not borne out, however, by the results obtained on separating the carthartic acid of Witte—the substance consisting of magnesium cathartate and calcium cathartate. The average yield of this product from the Alexandria senna was 1.4 per cent., that from the Tinnivelly variety, 1.1 per cent., or about one-fifth less.

In addition to containing a larger percentage of the main active constituent, Alexandria senna is of greater value in manufacturing the liquid preparations of the drug, for the reason that it contains a much smaller percentage of gummy matter, and is accordingly easier and more quickly extracted than the Tinnivelly variety. Tinnivelly senna has two advantages over the Alexandria variety; one is its appearance and the other its price. In the current retail quotations the minimum price of Alexandria senna is 25 cents per pound, and its maximum price 38 cents; the minimum price of Tinnivelly senna is quoted at 15 cents, and its maximum price at 30 cents. In point of appearance the Alexandria variety is always found to be more or less broken and crushed, and frequently mixed with a considerable quantity of leaf-stalks. The Tinnivelly variety is cleaner, and being much less brittle is unbroken, and in addition to being longer is seemingly fresher. A safe conclusion is to recommend the use of the Tinnivelly variety for sale at the counter, on account of its handsome appearance, and the use of the Alexandria variety in the manufacture of senna preparations on account of its greater strength and easier extraction.—Amer. Drug. and Pharm. Rec., 1894, 13.

The Kentucky State Pharmaceutical Association met at Paris, May 16–17, 1894. The following papers were read: "Local Organization," by Addison Dimmitt; "New Proprietary Remedies," by J. P. Barnum; "Facts from the Prescription File," by C. S. Porter; "Glycerin of Commerce," by G. Holzhauer; "Artificial Carlsbald Salts," by Charles I. Albus; "The Microscope in Pharmacy," by Louis Rominger; "Creosote of Commerce," by G. Holzhauer; "Syrup of Hydriodic Acid," by O. C. Dilly; "Emulsion of Cod Liver Oil," by G. Holzhauer; "How the Physician can be influenced to prescribe the preparations of the National Formulary," by G. Holzhauer. One of the association prizes was awarded to C. S. Porter for his paper on "Facts from the Prescription File," and the other to Louis Rominger for his paper, "The Microscope in Pharmacy."

Substitution.—Addison Dimmitt. Reprinted in Pharm. Era, 1893, 152; Bull. Pharm., 1893, 309.

LOUISIANA.

Proceedings of the Eleventh Annual Meeting of the Louisiana State Pharmaceutical Association.—Held at New Orleans, May, 1893.

Report of Committee on Adulteration and Deterioration of Drugs—J. A. Stock remarks on the preservation of drugs. An examination of drugs was as follows:

Glycerin.—Five samples. Three samples up to requirements. One sample showed the presence of butyric ether. One sample showed the presence of glucose.

Gum Opium.—Two samples. One sample contained 8 per cent. of sand and minute pebbles, 4 per cent. morphine. One sample contained 10 per cent. of sand and minute pebbles, 4.05 per cent. morphine.

Powd. Opium.—Three samples. Two samples up to requirements, containing more than 12 per cent. morphine. One sample contained 10.05 per cent. morphine. The method of J. Howard Wainwright was used for the above.

Lycopodium.—Three samples. Two samples found all right. One sample contained large amount of starch.

Sodium Bicarbonate.—Two samples. One up to requirements. One contained an excess of chlorides, sulphates and carbonates.

Cochineal.—One sample. Dusted with zinc oxide.

Senega.—One sample contained asclepias vincetoxicum.

MAINE.

Annual Meeting of the Maine Pharmaceutical Association.—Held at Bar Harbor, June, 1893. Reports of the officers and committee were read.

MASSACHUSETTS.

Proceedings of the Twelfth Annual Meeting of the Massachusetts State Pharmaceutical Association.—Held at Nantasket Beach, June, 1893.

Report of Committee on Adulteration and Sophistication.—The report of the State Board of Health is as follows:

Bennet F. Davenport, the State Analyst, reports that he made 424 analyses of drugs, and of this number he found 72 adulterated, or not conforming to the standard. The only unusual and not previously reported form of adulteration met with by him during the year, was a sample of lycopodium, composed wholly of precipitated sulphur. He states that he thinks that this was probably only an accidental substitution.

The number of articles found up to the standard were as follows: Opium, powdered, 5; opium, camphorated tincture, 1; quinine, 15; quinine and iron citrate, 15; ether, stronger, 26; alcohol, 8; iodoform, 7; chloroform, 1; chloral, 3; menthol, 3; lemon oil, 3; sweet almond oil, 1; honey, 3; glycerin, 44; saccharated pepsin, 8; bismuth salts, 12; confections, 4; magnesium sulphate, 3; cinnamon, 5; cloves, 5; ginger, 8; pepper, 2; arrow-root, 2; benzoic acid, tannic acid, 40; potassium bitartrate, 1; silver nitrate, 2; distilled water, 2. The other examinations resulted as follows:

	Standard.	Not.
Opium tincture	28	4
Nux vomica tincture	3	2
Spirit of nitrous ether	10	3
Comp. spirit of ether	1	7
Ethereal oil		1
Brandy		4
Red wine	2	3
Olive oil	21	19
Jalap		3
Cosmetics	10	18
Musk		1
Solution of magnesium citrate	7	1
Liquorice	11	1
Aloes	6	1
Lycopodium	10	1
Hydrobromic acid	1	1
Potassium, iodide	3	2

The articles, as taken from this portion of the report, which would call for serious watchfulness by the retailer are acetic ether, acetic acid, alum, precipitated carbonate of calcium, precipitated phosphate of calcium, calomel, potassium chlorate, potassa, soda, resin of scammony, sodium bicarbonate and potassium cyanide.

The following papers were read :

Do the Extreme Scientific Examinations of the Commissioners of Pharmacy Tend to Make the Drug Clerk More Careful and Efficient?—W. H. Glover replies in the negative.

Has State Registration Increased the Compensation of Drug Clerks and Advanced their Proficiency?—H. M. Whitney gives some idea of the work of the Board of Pharmacy, a few strange answers given to simple questions, the evident approval and endorsement of the people, the appreciation of a certificate by those who pass the Board, and the recognition by nearly every one of the fairness and value of the examinations. 3,340 certificates of registration have been issued. Of this number, 815 were granted upon satisfactory examination.

The first year there were 101 examinations, and 22 were successful, about 21¾ per cent. The seventh year there were 488 examinations, and 147 were successful, nearly 30 per cent. During the present year, from October 1st, 1892, to June 15th, 1893, there have been 500 examinations, and 115 were successful, just 23 per cent. Total examinations, 2339 : passed, 815, or about 34 per cent.

Quinine Tannate.—F. T. Drake. Preparation as follows :

Solution A. To four gallons of distilled water at 60° C. add 16 ozs. (avoir.) of quinine sulphate, and sufficient diluted sulphuric acid to effect solution. (From 16 to 20 fluidounces of diluted sulphuric acid are usually required.)

Solution B. Dissolve 48 ozs. (avoir.) of tannic acid in four gallons of distilled water at 60° C.

Mix solutions "A" and "B." The quinine tannate precipitates as a brown adhesive mass. This is washed while being worked by the hands, with two more portions of two gallons each of distilled water at 60° C. removed from the water and allowed to cool and harden. It is then coarsely powdered, and again washed with cold water until the washings cease to have a marked bitter taste, or to show presence of more than traces of sulphate when tested by barium chloride test solution.

The product is carefully dried at 60° C. and powdered. Sixteen ounces of quinine sulphate should yield by this process about 45 ounces of quinine tannate.

———, *Estimation of Quinine in Tablets of.*—The application of De Vrij's method (Proc., 1892, 744).—Owing to the nature of the chocolate, the process was a failure. The application of Lloyd's process for extraction of alkaloids from fluid extracts was adopted.

The process in detail is as follows :

Two tablets (each representing one grain of quinine tannate) are reduced to powder in a small wedgewood mortar, and the powder transferred to a test-tube. Rinse the mortar with 6 C.c. of diluted alcohol, add to contents of the test-tube, and boil for two minutes. Diluted alcohol is a good solvent for quinine tannate. Transfer the brownish mixture in the tube to the glass part of the "mechanical abstractor," and wash the tube with one or two portions of 1 C.c. each of diluted alcohol. Add to the contents of the glass 1 C.c. of solution of ferric chloride, U. S. P., and rotate until thoroughly mixed. The iron solution combines with the tannic acid of the quinine tannate to form a blue-black iron tannate or ink, and at the same time quinine hydrochlorate is formed. Sodium bicarbonate is now added in large excess sufficient to form a pasty mass.

This reacts with the excess of ferric chloride to form ferric hydroxide, sodium chloride and carbon dioxide, and with the quinine hydrochlorate to form quinine alkaloid, sodium chloride and carbon dioxide. 10 C.c. of chloroform are next added to the contents of the glass, and by the aid of the mechanical stirrer, the whole is intimately mixed. The separated chloroform is decanted and passed in succession through separators, containing respectively 10, 5 and 5 C.c. of diluted sulphuric acid. The chloroform, now free from alkaloid, may be thrown away, or better, saved and recovered for further use. Two more portions of 10 C.c. each of chloroform are agitated with the magma in the mechanical abstractor, separated and passed through the same separators containing the diluted sulphuric acid. The acid liquids in the second and third separators are transferred to the first separator. Both separators are washed with a small quantity of water, which is added to the mixed acid liquids. The acid liquid is made decidedly alkaline by addition of ammonia water, and the alkaloid washed out with three successive portions of 10 C.c. each of chloroform. The mixed chloroformic washings are evaporated, and the quinine dried at 100° C. and weighed as monohydrated alkaloid.

Should Druggists Prescribe?—J. S. Dudley answers in the negative.

Dangers Arising from Indiscriminate Use of New Remedies.—J. H. Manning quotes from Squibb's Ephemeris on the abuse and injury of new remedies.

Pharmaceutical Question Box.—Answers by E. L. Patch.

4. "Why should 48 grains of sulphate of quinine and 1 oz. of fluid extract of liquorice root separate a dense bulky precipitate?"

Trial with five different makes of fluid extract and a carefully examined normal sulphate proved that in each case the sulphuric acid was liberated from the quinine and the precipitate produced. In some cases it occurred within half an hour, and in others it required longer time. It was found that 12 drops of 10 per cent. ammonia water added to the fluid extract before triturating with the quinine prevented it.

5. "What accounts for the great variation in color of fl. ext. of belladonna root?"

The difference in alcoholic strength of menstruum used. The U. S. P., 1880, calls for strong alcohol, 91 per cent. by weight strength; the commercial products are made with weaker alcohol, which dissolves more coloring matter, and inert extractive.

6. "What causes the variation in fl. ext. of dog-grass?"

The U. S. P. calls for the extraction of the drug by boiling water, its concentration by evaporation, and lastly the addition of alcohol. The product is a syrupy body with a sweet, somewhat molasses-like odor. The commercial extracts made by direct percolation with alcohol and water, are distinctly different, the menstruum rejecting much that is extracted by boiling water.

7. "What shall I dispense for thymol water?"

1 grain of thymol and 4 fluid ounces of distilled water.

9. "My syrup of albuminate of iron constantly spoils and I do not succeed in making it from the scales. What shall I do?"

"Albuminate of iron is soluble in alkaline solution, and this on standing becomes bicarbonated, and can no longer hold the iron in solution."—Tscheppe, Am. Phar. Assoc.

Dry albuminate of iron is insoluble if made from alkali-soluble albuminate. A solution requires from 5 to 8 per cent. of alcohol to keep. It should contain 42 per cent. of metallic iron, or 6 per cent. of $Fe_2(OH)_6$.

Try an extemporaneous solution made as follows:

Sol. dyalized iron (5 per cent. oxide)	℥ j.
Sol. acid egg albumen	℥ ij.
Syrup	℥ iv.
Alcohol	℥ j.

Make the acid solution of egg albumen by beating ℥ ss of albumen with ℥iiiss of water, adding 6 minims of strong hydrochloric acid.

10. "Our official syrup of lactophosphate of lime precipitates and decomposes. Can you tell us how to remedy it or give us a better formula?"

Precipitated carbonate of calcium	20 G.
Phosphoric acid, 50 per cent	25 G.
Lactic acid, 75 per cent	50 G.
Orange-flower water	125 G.
Sugar	950 G.
Benzoic acid	5 G.
C. P. hydrochloric acid	1 G.
Distilled water to make	1670 G.

Laws Relating to Druggists and Apothecaries, Regulating the Sale of Poisons, Adulteration of Food and Drugs.—Extract from the public statutes of Massachusetts by J. H. Manning.

MICHIGAN.

Proceedings of the Eleventh Annual Meeting of the Michigan State Pharmaceutical Association.—Held at St. Clair Flats, June, 1893.

Report of Committee on Adulterations.—Reports to the effect that slippery-elm bark, white pine bark and rhubarb were adulterated, were unfounded. Sample of caffeine citrate contained a large excess of citric acid. A sample of caffeine hydrobromate consisted of alkaloid caffeine, a large amount of sodium acetate, and no bromide. Ammonia water contained iron. Calcined magnesia contained variable amounts of carbonate, and in one instance sulphate of calcium. Baking powders. Use of peanut oil as an adulterant. Adulteration of iodoform gauze, damar, sandal-wood oil, rose oil. Cod-liver oil—a case of adulteration with 95 per cent. vaseline oil. Arnica flowers with Italian arnicas—no arnicas at all. Artificial coffee leaves. Inferior castaneum as described by Fossek entering the commerce of Russia. Inferior grades of caramel are becoming quite frequent. Phosphon a baking powder, consisting of ammonia-alum-sulphate and calcium sulphate. Assay of laudanum: 0.7 to 1 per cent. morphine. Two samples of glycerin contained cane-sugar, iron and chlorides. Potassium iodide, lead chromate, linseed oil and a Southern flour, were found to be adulterated by J. O. Schlotterbeck. There is also a review of the adulterants as found in literature.

Mustard, Cloves and Pepper—Microscopical Examination of.—L. D. Haverhill found all of these to be adulterated in some instances. A table of source, price, quality and admixtures, with remarks, is given.—Reprinted in Pharm. Era, 1893, 54.

Acetamide—Manufacture of.—S. Coleman. Dry ammonia gas was passed into warmed glacial acetic acid, and the neutralization completed by adding stronger ammonia water. The ammonium acetate prepared in this manner was then heated for five or six hours at 250°, the flask containing the ammonium acetate being connected with a large reverse condenser. A part of the ammonium acetate was thus changed into acetamide and water, according to the equation $NH_4C_2H_3O_2=C_2H_3O_2NH_2+H_2O$. The flask then contained acetamide and a solution of ammonium acetate. Distillation was commenced, and that portion coming over above 180° retained separately. It entirely solidified upon cooling. The remainder of the distillate was then resubjected to the same treatment, and that portion coming over above 180° collected and added to the product retained before. This entire product was then redistilled to insure purity, and that portion coming over above 180° retained. This was dried over sulphuric acid. The yield when prepared in this manner is from 75 to 80 per cent. of the theoretical yield. The product is a white crystalline solid, quite deliquescent, and soluble in alcohol and water. It melts at 82° C. A portion of the product dissolved in benzene, in which it is but slightly soluble, recrystallizes in long needle-like crystals which are without odor.

Tincture of Iodine—Examination of Commercial.—F. H. Nickerson.

Assay Method.—A weighed amount of the tincture is titrated with solution of sodium arsenite, whose iodine equivalent has been carefully determined, using starch solution as an indicator. This gives the amount of free iodine in the liquid. The iodine in another weighed portion of the tincture is now, by the addition of excess of solution sodium arsenite, reduced to sodium iodide. Excess of solution of silver nitrate is added, precipitating *all* of the iodine as silver iodide. The solution is now strongly acidulated with nitric acid, dissolving both the silver arsenite and the silver arsenate, formed by the addition of the silver nitrate, while the silver iodide, being insoluble in dilute nitric acid, is unaffected. The precipitate is collected on a weighed asbestos filter, dried at 150°, and weighed. This gives the total amount of iodine present; subtracting from this the amount present as free iodine, gives the quantity present as hydriodic acid. The author appends the following results of twenty analyses:

Number.	Free Iodine. Per Cent.	Hydriodic Acid. Per Cent.	Total Iodine. Per Cent.
1	7.01	.27	7.27
2	6.53	.13	6.65
3	6.35	.35	6.69
4	5.42	.48	5.88
5	4.62	.29	4.90
6	5.61	.42	6.02
7	6.64	.08	6.72
8	7.22	.11	7.33
9	4.86	.39	5.25
10	4.82	.18	5.00
11	6.07	....	6.07
12	3.77	.29	4.05
13	5.35	....	5.35
14	7.08	....	7.08
15	5.65	.05	5.70
16	7.23	.23	7.45
17	5.14	....	5.14
18	5.78	.14	5.92
19	6.17	.07	6.24
20	5.94	.31	6.24

Classification of Incompatibles.—An Essay by S. G. Wertz. Dispensing of Incompatibles. Explosive and Inflammable Compounds.—See New Eng. Drug., 1893, 161.

Assay of Cod Liver Oil Emulsions.—W. B. Newton has employed two methods. The Adams method for the estimation of fats in milk as modified by Allen and Chattaway (Analyst, April, 1886, 71). The second a modification of this. About 5 Gm. are taken, weighing by difference in a weighing bottle; this is added to sufficient white sand to fill a Soxhlet's tube about a half inch below the upper bend of the syphon tube. The sand should have been treated with dilute hydrochloric acid, and thoroughly washed, until on stirring with water it is perfectly clear, and little or no sand is held in suspension on allowing to stand for a moment, then dry. This is primarily to clean the sand, and second, to rid the sand of the very fine particles. The dried sand and emulsion are triturated in a porcelain dish until thoroughly mixed, and dried on a water-bath. When dry or all water is driven off, it is again triturated until fine and the whole loosely placed in the Soxhlet's tube, at the bottom of which has been placed some asbestos wool. The pestle and evaporating dish when cooled are rinsed out with two or three portions of ether; this is added to the extraction apparatus and enough more ether for repercolation. Six or eight repercolations are usually sufficient for complete exhaustion. An emulsion which dries very hard requires a greater number of repercolations than one which does not dry hard. The ethereal solution is transferred to a separatory funnel, when it is washed several times with water. The water is drawn off and the ether decanted into a tared 100 C.c. flask, the separatory funnel is rinsed out several times with ether and the ether added to the flask. Connect the flask with a condenser and distil off the ether, then place the flask in the air bath, heat to 100°–110° C. to drive off any water held by the ether. Weigh and calculate the per cent. of oil.

In the table below, the later method was used for the estimation.

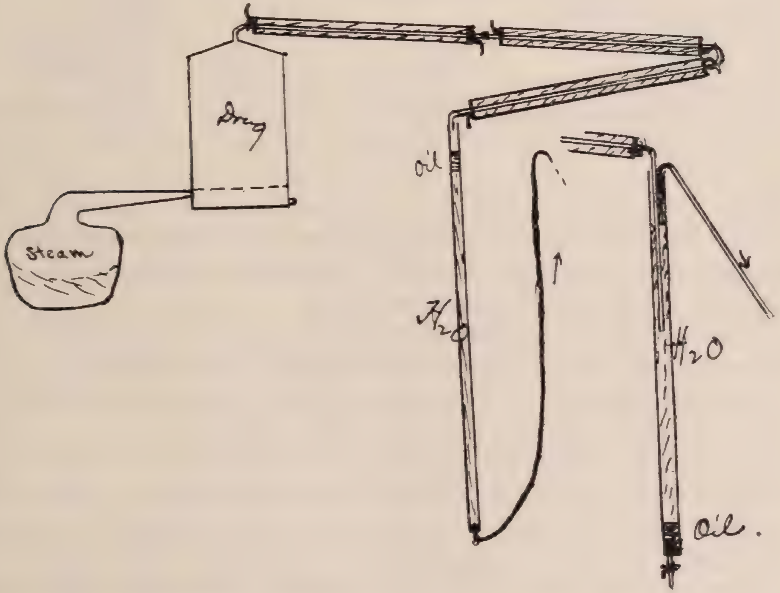
No.	Per Cent. Cod-liver Oil.	
1	47.9	No claim.
2	44.7	" "
3	44.5	Claimed to contain 50 per cent oil.
4	30.1	No claim.
5	41.6	" "
6	26.9	" "
7	65.5	Claimed 66 per cent. oil.
8	37.6	" 50 " " "
9	42.2	" 50 " " "

Isolation of Tannin from Tea and Coffee.—W. Scherer employed five different methods for tea, but without satisfactory results.

Distillation and Purification of Volatile Oils.—G. A. Morrison and C. E. Jackson. The distillation was by means of steam under slight pressure, the apparatus being suggested by an article by Albert M. Todd (Proc. 1886, 160), and consisting of a steam generator, a can to hold the material to be distilled, condensers and separators, see Fig. 38. The can for the drug was of tin, about 12 inches in diameter and 20 inches deep, having a tight-fitting conical shaped cover, with an outlet tube 1 inch in diameter in the centre for the escape of steam after it has passed through the drug. The can has a perforated removable false bottom about two inches from the true bottom. Just beneath this false bottom is a tube 1 inch in diameter for the entrance of steam from generator, and on the opposite side close to the true bottom is another small tube for drawing off the water collecting in the can, due to a slight condensation of the steam in passing up through the drug. An ordinary 5 gallon copper retort was used as a steam generator.

The material is packed in the can, the cover placed securely on, and the outlet tube connected with the condenser. The condenser was an improvised "Liebig" 2 inches in diameter, its length about 12 feet. The separator was a glass tube 5 feet in length and 1 inch in diameter. For the oils lighter than water, a small rubber tube was connected with the bottom of the separator, its outlet about 6 inches from the top of the separator, the separated water flowing out through this tube, the oil floating on the top of the water. For oils heavier than water, the glass tube was connected with the end of the condenser and run down into the separator 18 or 20 inches below the surface of water in it—the separated water drawn off the top by means of a syphon.

FIG. 38.



Distillation and Purification of Volatile Oils.

The material distilled being unadulterated, the only impurities in the oils were the water they would absorb and the mechanical impurities which might get in during distillation. The latter were removed by filtration and the former by either fused calcium chloride, ether or gelatin—(see table). The materials were all in a dry condition, and no doubt some of them lost some oil in the drying process: especially is this true of wintergreen and horsemint. The distillation was not made with a view to quantitative estimation of the per cent. of oil.

OIL.	COLOR.	No. of fluid ounces Obtained.	No. of pounds of drug distilled.	Water removed by	Part of plant used.
Allspice (Eugenia pimenta)	Reddish.	1½	5	Ether.	Fruit.
Star Anise (Illicium anisatum)	Light yellew.	2	5	$CaCl_2$.	Fruit.
Birch (Betula lenta)	Colorless.	1½	10	"	Bark.
Caraway (Carum carui)	Light yellow.	3	4	"	Fruit.
Red Cedarwood (Juniperus virginiana)	Nearly colorless.	5	10	"	Wood.
Cubeb (Cubeba officinalis)	Greenish.	2	2½	Ether.	Fruit.
Dill (Anethum graveolens)	Light yellow.	2	5	$CaCl_2$.	Fruit.
Eucalyptus (Eucalyptus globulus)	Reddish.	3¾	3	Gelatin.	Leaves.
Fennel (Fœniculum vulgare)	Colorless.	3	5	$CaCl_2$.	Fruit.
Horse-mint (Monarda punctata)	Light yellow.	¼	5	Gelatin.	Leaves and Tops.
Juniper (Juniperus communis)	Colorless.	¾	5	$CaCl_2$.	Berries.
Laurel (Lauris nobilis)	Light yellow.	1½	10	"	Leaves.
Lavender (Lavandula vera)	"	¾	7	"	Flowers.
Rosemary (Rosmarinus officinalis)	"	2	8	"	Leaves.
Spearmint (Mentha viridis)	"	1	10	"	Leaves and Tops.
Savine (Juniperus sabina)	Reddish.	¼	5	Ether.	Leaves and Twigs.
Sassafras (Sassafras officinalis)	Light yellow.	12	10	$CaCl_2$.	Bark of Root.
Thyme (Thymus vulgaris)	"	1	5	"	Tops.
Worm-seed (Artemisia Maritima)	Reddish yellow.	1	5	"	Unexpanded flowers.
Wormwood (Artemisia absinthium)	Green.	¼	5	Ether.	Tops.
Winter-Green (Gaultheria procumbens)	Nearly colorless.	⅛	10	"	Leaves.

The first portion of distillate contains most oil, the amount gradually decreasing. In most cases the steam was passed at least six hours.

In the distillation of oil of wormwood, the oil coming over first was of brown color, that coming over later changing to green.

Birch—As the oil does not pre-exist in the bark, but is developed on the addition of water, it was macerated 24 hours, then placed in the can, and steam passed through it 12 hours, the water in which it was macerated being used in the steam generator. Considerable difficulty was experienced in separating the oil and water, especially when distilled rapidly, and it was found necessary to introduce a second separator like the first, the water from the second separator being returned to the steam generator. The same difficulty was experienced in separation of oil of wintergreen.

Hydrastis Canadensis—Assay of Drug and Fluid Extract.— F. A. Thompson. See Proc., 1893, 691.

Glycocoll.—L. N. Benton describes its principal mode of manufacture, its derivatives and their properties, with a bibliography.—See Pharm. Era, 1893, 53.

MINNESOTA.

Proceedings of the Ninth Annual Meeting of the Minnesota State Pharmaceutical Association.—Lake Minnetonka, June, 1893.

Report of Committee on Adulterations.—The examination of one, two and three grain quinine pills of 5 manufacturers, showed a less quantity than that given. The examination of pepsin showed a great diversity of activity.—L. A. Harding.

Substitution.—A paper by R. Humiston on the effects of substitution on the health of the people, and the best means for its prevention.

The Pharmacal Profession.—F. J. Wulling.

Chemistry and its Relations to Pharmacy.—L. A. Harding.

Glycerin Suppositories.—L. A. Harding.

Stearic acid	2½	drachms.
Sodium carbonate	1	drachm and 15 grains.
Glycerin	5	ounces.

Heat the glycerin and stearic acid together, regulating the temperature so as to just melt the stearic acid; when dissolved, stir so as to perfectly mix the mass, then add the sodium carbonate to the mixture, and when dissolved pour into suitable moulds to cool. The product of the above formula should, if we were to let it cool in the evaporating dish, present a perfectly transparent solid, and suppositories made from it should show the same physical characteristics. They will then contain about ninety-five per cent. of glycerin. Should the mass, however, upon cooling, present an opaque appearance, the fault may be looked for in two directions. In the first place the amount of sodium carbonate may be deficient on account of the stearic acid of commerce. In this case carbonate of sodium should be added. The necessity of adding carbonate of sodium may be recognized by the fact that they are opaque in color and soft to the touch; the carbonate of sodium should be added, a small quantity at a time, until the desired result is obtained. Should, however, the product be opaque and very firm, glycerin is wanting and should be added until a perfectly clear product is the result. It must further be observed not to use a high degree of heat, not any higher than is absolutely necessary to dissolve the stearic acid, as otherwise a white foam will rise to the surface, which it is necessary to remove from the clear underlying solution. While this does not interfere with the product itself, it will increase the cost of the resulting product; just as much as there is foam to be removed, precisely the same amount of product is lost, whence the increased cost of the remainder.

MISSOURI.

Proceedings of the 15th Annual Meeting of the Missouri State Pharmaceutical Association.—Held at Excelsior Springs, June, 1893. The following papers were read:

Notes on Hydrogen Dioxide.—C. O. Curtman records results of examinations of commercial samples. From these a few are selected to show the diversity of strength when first sold, and of their keeping qualities and various admixtures.

A Few Suggestions on How to Study.—H. M. Whelpley.

Sensitive Iodine Preparations.—G. H. C. Klie exhibited some specimens of syrups made with glucose in place of ordinary sugar, the condition of which seemed to indicate that this method possesses advantages in certain cases. Syrups of hydriodic acid and of iodide of iron were shown, which had been made in March, 1892, and indicated no trace of deterioration. One sample of syrup of iodide of iron was made with glucose alone, and another with fifty per cent. only of the sugar replaced by glucose. Both were purposely kept without special care, the bottles being only half filled and exposed to light. The syrups remained, however, in excellent condition, and it was suggested that the proportion of glucose might be still further reduced without affecting the permanency of the products. It was stated that the syrups could be dispensed from shop rounds like any ordinary syrup, needing no special precautions.

The Druggists' Catechism.—L. E. Corcoran.

Relation of Specific Gravity to Atomic Weight.—A. N. Doerschuk. The impossibility of the molecular proportion is due to the fact that molecular weight is a constant quantity, being derived with all the elements from the same basis and under *similar* conditions, while specific gravity is a variable quantity, being derived with all the elements under *different* conditions, upon the same basis; and, as the same thing differently treated does not yield the same result, so the specific gravity and molecular or atomic weight of the same substance, differently derived, cannot be expected to be proportionate in any way.

Thirty-five Years a Druggist on the Missouri.—A. Breunert.

A Good Pharmacist—A Better Physician.—J. C. Falk.

With Our Medical Friends.—W. Mittelbach.

Syrup of Hypophosphites, Compound.—F. Hemm gives two formulas preferring No. II:

I.

Calcium hypophosphite	280 grs.
Potassium hypophosphite	128 grs.
Sodium hypophosphite	128 grs.
Manganese sulphate	24 grs.
Ferrous sulphate	24 grs.
Quinine hydrochlorate	8 grs.
Tincture of nux vomica	160 mins.
Diluted hypophosphorous acid, N. F.	30 mins.
Glycerin	2 fl. ozs.
Distilled orange flower water	2 fl. drs.
Sugar, granular, Crown A	10 ozs.
Distilled water, sufficient to make	16 fl. ozs.

Dissolve 24½ grains of the hypophosphite of calcium in 1 fluid ounce of distilled water, and filter or strain through cotton. In 2 fluid drachms of distilled water dissolve the sulphates of manganese and iron, add the diluted hypophosphorous acid, and filter or strain. Mix the two solutions in a small vial, just capable of holding the amount, and agitate several times while letting it react for one hour. Dissolve the hypophosphite salts in 4 fluid ounces of distilled water, and add the glycerin and orange-flower water, into which filter the solution of iron and manganese hypophosphites; now add the hydrochlorate of quinine and the tincture of nux vomica, agitate until dissolved, and filter through paper. Place the sugar into a graduated bottle, pour upon it the clear filtrate, mix well, and if required add sufficient more distilled water to bring it up to the measure of 16 fluid ounces. Agitate frequently until all of the sugar is dissolved, and finally pass through white filter paper.

II.

Calcium hypophosphite	280 grs.
Potassium hypophosphite	128 grs.
Sodium hypophosphite	128 grs.
Manganese sulphate	24 grs.
Ferrous sulphate	24 grs.
Quinine (dry)	8 grs.
Strychnine (dry)	½ gr.
Diluted hypophosphorous acid, N. F.	30 mins.
Glycerin	2 fl. ozs.
Distilled orange flower water	2 fl. drs.
Sugar, granular, Crown A	10 ozs.
Distilled water, sufficient to make	16 fl. ozs.

Dissolve 24½ grains of the hypophosphite of calcium in 1 fluid ounce of distilled water, and filter or strain through cotton. The iron and manganese sulphates dissolve in 2 fluid drachms of distilled water, and add the diluted hypophosphorous acid; filter or strain through cotton. Mix the two solutions together in a small bottle, just large enough to contain the same, and agitate it several times while leaving it react for one hour. Dissolve the hypophosphite salts in 4 fluid ounces of distilled water, to which add the glycerin and orange-flower water. Filter also the solution of iron and manganese hypophosphites into it, add the quinine and strychnine, and shake frequently until dissolved, and if necessary, add drop by drop, diluted hypophosphorous acid to effect solution. Put the sugar into a graduated bottle, and filter this solution upon it: shake well, and if required, add sufficient more distilled water to make the whole measure 16 fluid ounces. Now shake often until all the sugar dissolves, and then filter through white filter paper.

Historical Reminiscences of the Past Fifteen Years.—F. R. Dimmitt.

Report of Committee on Drug Adulterations.—C. C. Hamilton.

Alcohol.—Eight samples examined. They contained 91 to 93 per cent.

Camphor.—Ten samples examined contained 93 to 96 per cent. camphor.

Honey.—Ten samples bought from usual sources of the retail druggist's supply, and all found to be genuine.

Syrup.—Ten samples bought from wholesale trade. One sample gave 32 per cent. sucrose, the others 60 to 70 per cent.

Cream of Tartar.—Twenty samples examined of which two samples were adulterated, one with a siliceous earth, the other with starch.

Beeswax.—Ten samples examined of which two contained flour and a third an unsaponifiable wax.

Capsicum.—Out of ten samples two were adulterated.

Ginger.—Out of eight samples two contained starch and turmeric.

Ipecac.—Out of four samples one contained turmeric.

Sugar of Milk.—Eight samples were examined and found to contain 87 to 99 per cent. of lactose.

Ether.—Of twelve samples none gave less than 70 per cent. of ethereal layer after agitating with an equal bulk of water.

No adulteration was found in samples examined of jalap, acacia, iris, rhubarb and senna.

Fifty Health Hints.—H. M. Whelpley.

NEBRASKA.

Nebraska Pharmaceutical Association.

Ethical Patent Medicines—Analyses of Some.—H. W. Snow has made analyses. Reprinted in West. Drug., 1893, 476.

The Duty of the Drug Clerk.—Reprinted in West. Drug., 1894, 172.

NEW HAMPSHIRE.

Proceedings of the Twentieth Annual Meeting of the New Hampshire Pharmaceutical Association.—Held at Isles of Shoals, Sept., 1893.

Report on Progress of Pharmacy.—Mr. Morse.

NEW JERSEY.

Proceedings of the Twenty-third Annual Meeting of the New Jersey Pharmaceutical Association.—Held at Atlantic City, May, 1893.

The following papers were read:

The Character of the Drugs, Foods, etc., as Sold at Present in Our Market at Newark, N. J.—A. Drescher examined milk, butter, cheese, flavoring essences, liquors, india-rubber goods, and particularly cigarettes. Medicinal substances stood the following tests:

Article.	No. of Samples.	Source.	Analytical Data and Remarks.
Paregoric	3	Druggists.	Standard quality U. S. P.
"	2	Grocers	Foreign red color, adulterated.
Mustard	1	"	Adulterated with starch and turmeric.
Laudanum	8	Druggists.	1.35 per cent. 1.189 per cent. 1.41 " 1.264 " 1.205 " 1.184 " 1.250 " 1.33 " Morphine, per cent. Above or approaching the minimum standard.
Laudanum	4	Druggists.	0.288 per cent. 1.022 " 1.075 " 0.830 " Morphine, per cent. Below minimum standard — all samples (4).
Laudanum	4	Grocers	0.95 per cent. 0.764 " 0.798 " 0.788 " Morphine, per cent. All four below minimum standard.
Arsenic	1	Druggist	No red label, no label at all! The words "arsenic, poison," written on wrapper with ink and pen.
Seidlitz Powders	2	Druggists.	Contents and weight all correct.
Ess. peppermint	1	Druggist	5.375 per cent. oil peppermint Deficient, one-half oil.
Ess. peppermint	3	Grocers	1. Oil ppt., 1.68 per cent. Water, 43.145 " Alcohol, 54.725 " Loss, 0.450 " 2. Oil ppt., 1.65 per cent. Water, 47.85 " Alcohol, 50.20 " Loss, 0.30 " 3. Oil ppt., 1.68 per cent. Water, 43.27 " Alcohol, 54.62 " Loss, 0.43 " All grossly adulterated with water and miserably deficient in oil of peppermint and alcohol.
Hoffman's Anodyne.	1	Peddler	Alcohol, 32.8 per cent. Water, 52.7 " Ether, 14.5 " Grossly adulterated with water. Deficient in oil of wine and every other ingredient.

NEW MEXICO.

Formation of the New Mexico Pharmaceutical Association.—We are informed through Drug. Circ., 1893, 260, of the formation of the Pharmaceutical Society of New Mexico.

NEW YORK.

The Fifteenth Annual Meeting of the New York State Pharmaceutical Association was opened in June, 1893, at Lakewood-on-Chautauqua.

Report of Committee on Adulterations.—R. G. Eccles.

A committee from the Women's Christian Temperance Union met the legislative committee for the purpose of obtaining the views of the pharmacists in regard to some practical legislation restricting the sale of opium, cocaine, chloral, etc., with no very definite result, except that the woman's committee agreed to submit drafts of any proposed legislation on the subject to the legislative committee.

A resolution was passed denouncing the amendment to the pharmacy law passed by the last legislature, extending the time of registration to certain classes of pharmacists as special, if not personal legislation, opposed to public interest, and greatly tending to nullify the work of the Boards of Pharmacy.

NORTH CAROLINA.

Proceedings of the Fourteenth Annual Meeting of the North Carolina Pharmaceutical Association.—Held at Greensboro, Aug., 1893.

Report of Committee on Education.—An endeavor to have established a Chair of Pharmacy at the University of North Carolina.

Granular Effervescent Preparations.—A. Bradley has performed numerous experiments and finds 95 per cent. (by volume) ethylic alcohol, as recommended by the National Formulary, to be the best agent for general use as a moistening agent. He employs four copper wire sieves, Nos. 6, 20, 40 and 60; No. 6 to pass the pasty mass through upon the glass shelf, No. 20 to separate the dried granules from the dust; some manufacturers, to prevent any loss, do not separate it. Nos. 40 and 60 are used for thoroughly mixing the different ingredients. The temperature of the drying apparatus, with but a few exceptions, should always be constant, taking care not to allow it to go above 158° F., for fear of converting the sodium bicarbonate back into the carbonate, through the loss of carbon dioxide, and also the formation of caramel in those preparations containing sugar with tartaric acid.

The loss in weight encountered in drying the following articles, as found in commerce, is:

	PER CENT.
Citric acid	8 to 10
Sodium bicarbonate	2 to 3
Tartaric acid	$\frac{1}{500}$

FORMULAS.

1. *Granular Effervescent Cœffeine Citrate.*

Caffeine citrate	20 grains.
Sodium bicarbonate	600 grains.
Citric acid	300 grains.
Tartaric acid	240 grains.
Powdered sugar	620 grains.

2. *Granular Effervescent Caffeine Citrate and Phenacetin.*

Caffeine citrate	20 grains.
Phenacetin	100 grains.
Sodium bicarbonate	600 grains.
Citric acid	300 grains.
Tartaric acid	240 grains.
Powdered sugar	620 grains.

3. *Granular Effervescent Potassium Bromide.*

Potassium bromide	½ troy oz.
Sodium bicarbonate	3¾ troy oz.
Tartaric acid	1¼ troy oz.
Citric acid	2 troy oz.

4. *Granular Effervescent Caffeine Citrate ana Potassium Bromide.*

Caffeine citrate	50 grains.
Potassium bromide	½ troy oz.
Sodium bicarbonate	3¾ troy oz.
Tartaric acid	1¼ troy oz.
Citric acid	2 troy oz.

5. *Granular Effervescent Magnesium Sulphate.*

Dried magnesium sulphate	400 grains.
Tartaric acid	300 grains.
Citric acid	240 grains.
Powdered sugar	460 grains.
Sodium bicarbonate	600 grains.

(This is practically identical with the granular effervescent magnesium citrate on the market.)

6. *Granular Effervescent Vichy Salt.*

Potassium bicarbonate	45 grains.
Sodium bicarbonate	5 troy oz.
Magnesium sulphate	45 grains.
Sodium carbonate	5 troy oz.
Tartaric acid	1½ troy oz.
Citric acid	2 troy oz.

7. *Granular Effervescent Pepsin.*

Pure powdered pepsin	50 grains.
Citric acid	1¾ troy oz.
Tartaric acid	1½ troy oz.
Powdered sugar	½ troy oz.
Sodium bicarbonate	3¾ troy oz.

8. *Granular Effervescent Pepsin and Bismuth.*

Pure powdered pepsin	50	grains.
Bismuth and ammonium citrate	50	grains.
Citric acid	1¾	troy oz.
Tartaric acid	1½	troy oz.
Powdered sugar	½	troy oz.
Sodium bicarbonate	3¾	troy oz.

Zinc Ointment.—A. Bradley suggests the following formula:

Zinc oxide	2 oz. av.
White refined petrolatum	8 "

Melt the petrolatum and rub in thoroughly the oxide of zinc in a mortar, until a smooth mixture is effected. This preparation remains free from granulation and rancidity.

Permanent Syrup of Iron Iodide.—A. Bradley recommends

Iron in form of card teeth	266	grains.
Resublimed iodine	2	oz. av.
Granulated sugar	10½	oz. av.
Syrupy glucose	3½	oz. av.
Hypophosphorous acid (10 per cent.)	3	fl. dr.
Distilled water, q. s. ft.	1	pint.

Add to the iron and 5 fl. oz. of distilled water, in a sufficiently large flask, the iodine. After the reaction ceases pour the solution of iron iodide on a filter, taking care that the orifice of the funnel is beneath the mixture of sugar and glucose contained in a porcelain vessel. Apply heat, and continue until the boiling point is reached. When cold add the hypophosphorous acid, and sufficient distilled water to make one pint. Store away in 2 oz. bottles, accessible to light.

PENNSYLVANIA.

Proceedings of the Sixteenth Annual Meeting of the Pennsylvania Pharmaceutical Association.—Held at Saegertown, June, 1893.

Report of Committee on Adulterations and Deteriorations.—Asafœtida and elm bark can be obtained of excellent quality.—E. M. Boring.

——— Seeds of Plantago lanceolata sold for cumin; Asclepias cornuti root for elecampane.—J. W. Crawford.

The Manufacture of Linseed Oil.—The difference between the old and the new process.—W. W. Reed.

The Pennsylvania Pharmaceutical Association as Compared with Other State Pharmaceutical Associations.—J. A. Miller.

Syrup Cimicifuga.—S. W. Heinitsh.

Powdered cimicifuga (No. 60)	4 oz. (Troy).
Diluted alcohol	q. s.
Carb. magnesia	2 dr.
Sugar (granulated)	14 oz. (Troy).
Water, q. s. ft.	1 pint.

Moisten the cimicifuga with four ounces diluted alcohol, pack in a percolator, then add diluted alcohol to cover, and macerate forty-eight hours. After this allow percolation to proceed, adding sufficient diluted alcohol until exhausted; then evaporate the percolate on a water-bath until it measures eight ounces. Triturate this with the carbonate of magnesia and filter, adding a sufficient quantity of water through the filter to make it measure eight ounces. Transfer the sugar to a percolator, add the filtrate, and make the syrup by the cold process.

Can the Average Retail Drug Store be successfully Conducted by omitting Patent Medicines?—J. F. Patton outlined a policy by which it may be done.

Is it true that the Odor of Vanilla is Developed by Artificial Means and does not exist Naturally?—C. B. Lowe. When the beans are first gathered they have scarcely any aroma, but it is developed by the following process: Quantities of them are thrown into large boxes where, being covered by blankets, sweating ensues, and some fixed oil exudes which may be afterwards used to dress the beans; they are afterwards spread out in layers and exposed to the sunlight. The alternate sweating and exposure is done repeatedly until the color and aroma are fully developed; the latter is supposed to be caused by a fermentation which takes place in some of the constituents of the bean.

Does any Valid Objection exist to the Use of Tonka Beans as a Culinary Flavor, if sold under the proper Designation?—C. B. Lowe replies—"None."

Pharmaceutical Note.—C. B. Lowe notes a precipitate of tartar emetic in compound fluid extract of squills, prepared by a firm of manufacturing pharmacists for making the compound syrup.

Personal Recollections of Christopher Columbus.—J. H. Redsecker.

QUEBEC.

The Twenty-fourth Annual Report of the Council of the Pharmaceutical Association of the Province of Quebec.—With proceedings of the annual meeting held June, 1894.

RHODE ISLAND.

No Proceedings issued for 1893.

TENNESSEE.

Proceedings of the Tennessee State Druggists' Association at its Ninth Annual Meeting.—Held at Chattanooga, May, 1894. The following papers were read:

Organization.—R. H. Gordon.

Pharmaceutical Preparations.—G. C. Childress. A plea for high standards.

Associations and Vacations for Druggists—Are they Sources of Benefit?—Adapted and read by A. A. Yeager. Answer, "Yes."

The Work of the Board of Pharmacy.—R. H. Gordon.

Granular Effervescent Salts.—Is it practical for the pharmacist to make his own? J. M. Ely makes a compilation of formulas from various sources.

Vegetable Hairs—Microscopical Examination of.—E. A. Ruddiman has examined the hairs of nux vomica, anise, hops, sumach, arnica flowers, lavender flowers, marigold, hyoscyamus leaves, digitalis, matico, mullein, salvia, hedeoma, melissa, wormwood, eupatorium, erigeron, lobelia, marrubium, helianthemum canadense, catnip. Description and measurements are given.

TEXAS.

Fourteenth Annual Meeting of the Texas Pharmaceutical Association.—Held at Austin, May, 1894.

Pharmaceutical Education.—J. Kennedy.—Reprinted in Amer. Drug. and Pharm. Rec., 1894, 328.

UTAH.

First Annual Meeting of the Utah Pharmaceutical Association.—Held at Ogden, May, 1893. The following papers were read:

Some Thoughts for the Druggist.—A. S. Condon.

Handwriting on the Wall.—C. F. Belson. A report showing the work performed by the board of pharmacy was read, and in this connection a legal opinion from the attorney for the association, on the statute creating the board, was submitted by Dr. Hurlbut. The attorney says that the law, as passed by the legislature, is perfectly constitutional, as the legislature thereby exercises the proper police protection over the people of the territory, and that no person should be allowed to practice pharmacy unless he has first complied with the same.

VIRGINIA.

Proceedings of the Twelfth Annual Meeting of the Virginia Pharmaceutcal Association.—Held at Blue Ridge Springs, September, 1893.

Report of Committee on Sunday Observance.—H. Blair recommends that the pharmacists conduct their business on Sunday only for the purpose of supplying what is needed for the sick.

Facts and Points about Quinine.—A compilation by R. Brydon. It is impossible to make a satisfactory abstract. We give the following table of the ground of the quinine trade, and its consumption in the United States, viz:

QUININE AND ALL OTHER SALTS OF, ENTERED FOR CONSUMPTION, FISCAL YEARS 1867–92 INCLUSIVE.

	Sulphate of Quinine.		All other Salts of Quinine.		Cinchonidia.		Total.	
1867	79,478	$89,195					79,478	$89,195
1868	40,675	50,979					40,675	50,979
1869	117,996	111,886					117,996	111,886
1870	37,551	36,768					37,551	36,768
1871	10,861	12,261					10,861	12,261
1872	34,723	32,645					34,723	32,645
1873	122,784	221,349					122,784	221,349
1874	68,097	125,510	569	$768			68,666	126,278
1875	12,279	17,490	1,428	2,226			13,707	19,717
1876	22,746	31,117	1,413	2,046			24,159	33,163
1877	75,894	236,949	681	1,089			76,485	238,038
1878	17,549	50,858	99	435			17,648	51,293
1879	228,348	626,567	617	755			228,965	627,322
1880	416,998	1,111,254	406	720			417,404	1,111,974
1881	408,851	1,052,228					408,851	1,052,228
1882	794,495	1,554,350	392	1,388			794,887	1,555,738
1883	1,055,764	1,809,798	97	248			1,055,861	1,810,040
1884	1,263,732	1,619,163	712	1,038	381,885	$206,405	1,646,329	1,817,606
1885	1,390,126	1,292,794	5,435	1,868	478,774	220,846	1,874,308	1,515,508
1886	1,251,556	887,599	131,747	15,509	449,414	56,699	1.832,717	959,807
1887	2,180,157	1,098,547	1,505	1,225	570,162	41,601	2,751,824	1,141,373
1888	1,603,936	647,654	6,226	2,766	609,576	28,883	2,219,738	679,300
1889	2,825,008	917,322	82,337	31,001	171,251	6,839	3,078,596	955,162
1890	2,990,239	886,430	53,115	13,980	106,829	5,379	3,150,183	905,789
1891	3,079,000	805,821	112,013	23,977	156,229	3,856	3,347,242	833,654
1892	2,686,677	542,440	156,442	29,366	11,483	1,586	2,854,602	573,392

There is much material showing the increased production of crude material (cinchona bark), with its decreased cost and the decreased cost of the finished product. The U. S. government is an unknown quantity in the whole business of bark producing, on which the whole decline hangs.

Lemon Kali—Origin of.—Letter of J. Attfield to C. B. Fleet. "It appears, according to Mr. Ince's late father, that one, Charles Gomond Cooke, of the celebrated English firm of Godfrey and Cooke, not only was a sufficiently clever pharmacist to invent this effervescent saline on which you and I have corresponded, but being an astute man of business, and not wishing all the world to know at once how the article was made, was clever enough to invent its name; as well as, I may add, to devise for it special bottles, soon afterwards and ever since used throughout English pharmacy under the name of 'Salines.' Thus for years did he hold a trade monopoly, by disguising a carbonate of sodium under its ancient name of 'Kali,' enhancing the mystery by the words 'lemon and.'"—Amer. Drug. and Pharm. Rec., 1894, 189.

WISCONSIN.

Proceedings of the Thirteenth Annual Meeting of the Wisconsin Pharma-

ceutical Association.—Held at Fond du Lac, Aug., 1893. The following papers were read:

Examination of Lime Water.—W. J. Wehle examined 30 samples. From the results obtained eight specimens meet the requirements of the Pharmacopœia, while about twenty-two (which contain from .12 to .14 per cent.) may be considered passable, the balance, however, being deficient, and two may be considered hydrant water.

Canella Alba—Volatile Oil of.—H. N. Brunn examined the oil. By treating the oil with a concentrated solution of caustic potash about one-third of it went into solution and was separated from the remaining oil. Upon the addition of an acid to the aqueous solution, the eugenol separated out was collected and subjected to careful distillation. Two fractions were obtained, one distilling between 225° and 244°, and the other at 247°, which corresponds with the boiling point of eugenol. After drying with calcium chloride, this fraction, upon combustion, yielded the following results:

Calculated for $C_{10}H_{12}O_2$		Obtained.	
		I.	II.
C.	73.17 %	73.41 %	73.53 %
H	7.30	7.05	6.56

Benzoyl-Eugenol.—For further proof of the identity of this compound, a benzoyl derivative was prepared by adding to a small portion in concentrated soda solution, benzoyl chloride, which forms an amorphous precipitate, easily purified by re-crystallization from alcohol. The melting point was found to be 69 to 70°, which was identical with that of benzoyl-eugenol prepared from eugenol.

That portion of the oil not affected by the aqueous solution of caustic potash, was subjected to distillation, whereby the following fractions were obtained:

I.	170°	VI.	200–225°
II.	170–176°	VII.	225–240°
III.	176–180°	VIII.	240–250°
IV.	180–190°	IX.	250–260°
V.	190–200°	X.	260–270°

Since the similarity in odor of a portion of oil from canella alba with eucalyptol has been observed, fraction 170–180°, having the characteristic cineol odor, demanded particular attention. The quantity obtained was small, but sufficient to ascertain its optical inactivity, and to allow of its conversion into cineolic acid and to identify the latter. This was accomplished by oxydizing fractions II. and III. with an aqueous solution of permanganate of potassium. The cineolic acid obtained corresponded in physical properties with those of cineolic acid prepared from pure cineol. The acid crystallized in yellow colored needle-shaped crystals from hot water, and melted at 197°. (Compare: Annalen der Chemie, Vol. 246, p. 368.)—Reprinted in Notes on New Rem., 1893, Vol. VI.

Mannitol from Canella Alba.—To an aqueous infusion of the bark, solution of basic lead acetate was added until the gummy matter was precipitated. From the filtrate the excess of lead was removed with hydrogen sulphide. The filtrate from the lead sulphide was evaporated to dryness and the residue extracted with alcohol in a flask connected with a reflux condenser. From the hot alcohol after filtration white needle-shaped crystals separated, which, when dried, melted at 165°, and apparently are identical with mannitol.

Advertising Studies.—A. C. Morrison. Tell the truth and do not in advertising shoot over the heads of your patrons.

Nitroso Chloride—The Mother Liquor of.—E. Hauf. From results it would seem that at least one of the by-products found in the preparation of limonene nitroso-chloride is an oxidation product, $C_{10}H_{16}O$, which yields a tetra-bromide, $C_{10}H_{16}OBr_4$.

Menthene Nitroso-Chloride—Mother Liquor from.—The crystals deposited were those of menthene nitroso-chloride.

American Pennyroyal Oil.—C. J. Habhegger has prepared pulegoneoxime from the American oil. It is identical with the pulegoneoxime of Beckmann and Pleissner, obtained from the oil of Mentha pulegium. He also obtained a benzoyl-ester of pulegoneoxime.

Terpenes of Spearmint Oil.—W. F. Gilman subjected the oil to fractional distillation. The following fractions were obtained: 160–180°, and then small fractions every five degrees from 180 to 205° and a large fraction between 205–230°. Above 230° a viscid black oil remained. The fractions obtained from the two specimens had the following specific gravity and rotary power—the latter estimated in a 100 Mm. tube.

	I.	II.
Sp. gr	0.8654	0.8643
Rot. power	36.33°	36.38°

From the first fraction a nitroso-chloride was prepared according to Wallach's method. The yield, however, was very small. Without further purification the nitroso-chloride was converted into a nitrol-benzylamine base. After recrystallization the needle-shaped crystals melted at 93–94° C. The two fractions were then mixed and again submitted to more careful fractional distillation, collecting fractions of 5° each.

A review of this work may be given in the following table:

Fraction.	Sp. Gr.	Composition.	Nitroso-Chloride.	Nitrol-benzylamine.
160—165°	0.8290	About 4 per cent. of O.	None	None
165—170°	0.8500		Yield of 13.4 per cent.	Needles. M.P. 92½°
170—175°	0.8543	About 2 per cent. of O.	Yield of 3.3 per cent.	Needles. M.P. 90—92°
175—180°	0.8665		Yield of 7.53 per cent.	Needles. M.P. 92—92½°
Limonene	0.846	$C_{10}H_{16}$	Alpha=tabular crystals. M. P. 103—104°. Beta=needles. M. P. 100—106°	Alpha=M.P. 93° Beta=not obtained pure.
Carvol	0.953	$C_{10}H_{14}O$.		

The composition of spearmint oil, as far as definitely ascertained, is, therefore, lævogyrate carvol and lævogyrate limonene, presumably also lævogyrate pinene. It is of interest to note that lævogyrate limonene and lævogyrate carvol occur together in the oil of spearmint, whereas dextrogyrate limonene and dextrogyrate carvol occur together in the oil of an umbelliferous plant, namely, oil of caraway.—Reprinted West. Drug., Aug., 1893.

Citronelloxime.—O. W. Anderson, among other things, finds that if to a small portion of oxime, in ethereal solution and kept on ice, bromine was gradually added, which was readily decolorized, a small quantity of crystals were formed, and on evaporation of the ether, more crystals separated, but on standing a short time they suffered decomposition. Hydrobromic acid gas was allowed to pass through an ethereal solution of the oxime; crystals separated, but in too small a quantity to admit of further investigation. A heavy dark-brown liquid was also formed. The liquid was insoluble in ether, but soluble in alcohol. An attempt was made to distill the liquid. Under a pressure of 15 Mm., the substance began to distill below 80° C. A clear, colorless liquid was distilled over first, which had an agreeable odor, resembling sassafras. The distillation was discontinued, and there remained in the flask a dark, crystalline mass. This was taken up with ether and allowed to evaporate. On standing a short time, crystals separated, but were soon decomposed.

Fraxinus sambucifolia, Lam.—W. J. Wehle failed to extract mannitol, but obtained a glucoside crystallizing in white needles, of bitter taste, soluble in water, hot alcohol and hot acetic ether, insoluble in ether, in aqueous solution optically inactive.

Fraxinus viridis, Mx.—H. O. Hilpert failed to obtain mannitol. He obtained a glucoside which upon re-crystallizing from acetic ether possessed M. P. 173–174.5.

Oil of Erigeron Canadense, L.—F. W. Meissner's results verify the statements that erigeron oil consists chiefly of dextrogyrate limonene. Even those fractions which possessed a somewhat higher or lower boiling point, evidently consist almost entirely of this hydrocarbon, the boiling point of which is slightly depressed or raised by other substances. The thought that pinene possibly occurred together with limonene in the oil evidently must be dismissed. The principal constituent of the oil besides limonene appears to be a high boiling substance, probably aldehyde-like in character, since it so readily decomposes and polymerizes. In order to isolate this substance, other methods than fractional distillation under ordinary pressure must be resorted to.

Benzylidine Dipiperidine.—G. W. Ascott obtained two compounds by the action of hydrogen sulphide upon benzylidine piperidine and also benzylidine aniline.

Several New Derivatives of Menthene.—A. L. Emde has prepared menthene nitrosate, a benzylamine base, nitroso-menthene, an aniline base. Negative results were obtained in attempting to prepare the piperidine base, and also in the regeneration of menthol from menthene.

The Isoterpenes of Flawitzky.—E. Williams used American oil of turpentine. By comparing these results with those recorded by Flawitzky, it will be seen that the rotatory power, both of the original terpene used and of the hydrated product, is much less than that of the Russian and French oils and their corresponding hydrated products. And, whereas, Flawitzky records an increase in the rotatory power as a result of the hydration, the table shows a decrease.

Menthene Nitro-Chloride and Ammonia.—W. D. Roberts has investigated several substances never studied before.

Peppermint Oil—The Hydrocarbons of.—R. I. Halsey. The mixture is evidently much more complex than was supposed, and the fractions in which the hydrocarbons could be suspected were not large enough to admit of better separation by fractionation. It is of interest, however, to have shown that lævogyrate pinene is a constituent of American peppermint oil. The table of fractions indicates the presence of other substances besides pinene, and it is to be hoped that more careful study of these fractions can be made in the near future.

Nitroso-Menthene and its Reduction Products.—W. A. Turner has further studied nitroso-menthene and its reduction products.

Triticum repens—Chemical Constituents of the Rhizome.—H. R. Pope failed to obtain mannitol. On treating triticin with phenylhydrazine, the results of analyses indicate the osazone of a sugar with 6 carbon atoms. An oxime on a small scale was obtained with triticum and hydroxylamine. The crystals of inosite were obtained.

WASHINGTON.

Proceedings of the Fourth Annual Meeting of the Washington State Pharmaceutical Association.—Held at Spokane, May, 1893. Contains the annual address of the President and report of the Committee on Legislation, etc.

NEW REMEDIES.

COMMERCIAL NAMES AND COMPOSITION.*

Abrastol—New name for asaprol; calcium betanaphtholalphamonosulphonate.—Antiseptic.

Acetal—Diethylacetal—Ethylidendiethylether.

Acetophenone—Hypnone; hypnotic.

Acidum Asepticum or Aseptinicum—Mixture of hydrogen peroxide solution with boric acid and salicylic acid.

Agathin—Salicyl-a-methylphenylhydrazone.

Agnine—Impure lanolin.

Agopyrin—Tablets containing a mixture of salicin, ammonium chloride and cinchonine sulphate.

Alphol—Ether of the salicylate of alpha-naphtol.

Alumnol—Aluminum beta-naphtolsulphonate.

Amidol—Diamidophenol hydrochlorate.

Amylene—Pental—Trimethylethylene.

Amylenehydrate—Dimethylethylcarbinol.

Analgen—Orthoxethyl-a-monobenzoylamidoquinoline.

Anaspalin—Mixture of lanolin and vaselin.

Angioneurosin—Nitroglycerin.

Annidalin—Aristol—Dithymoldiiodide.

Anodynin—Antipyrin.

Antacidin—Calcium saccharate.

Anthrarobin—Leuco alizarin. Dioxyanthranol.

Antibacterin—Mixture of crude aluminum sulphate and soot. Electric irritability.

Antibenzinpyrin—Constitution unknown (a patented substance which, it is claimed, prevents benzin, etc., from being struck by lightning.)

Antidiptherin—Metabolic product of diphtheria bacilli; prepared by *Klebs*—Specific against diptheria.

Antidysentericum—Mixture of pelletierine, extract of pomegranate and myrobalans.

Antifungin—Magnesium borate.

Antikamnia—Mixture of acetanilid, sodium bicarbonate and caffeine.

Antiphthisin—Metabolic product of tubercle bacilli (?).—Remedy against phthisis.

Antirheumatin—Mixture of sodium salicylate and methylene blue.

Antisepsin—Two substances have appeared under this name, viz.: monobrom-acetanilid, and the serum of animals which have been treated with iodine terchloride.

Antispasmin—Mixture of sodic narceine and sodium salicylate.

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* See, also, List in Proc. 1893.

Antitoxin—This has been applied to two products, the first that of the spirillum of exanthematic typhus, and the second that of bacteria in general.

Apyonine—A succedaneum of yellow pyoktanin.

Aquozone—A two per cent. aqueous solution of ozone, with hypophosphites.

Benzoparacresol—Benzoylparacresol.

Bergamol—Inolyl acetate (used in perfumery only).

Bromamide—Bromaniline hydrobromate.

Camphar—Fifty per cent. alcoholic solution of camphor, with the latter in excess.

Camphoid—Solution in absolute alcohol of camphor and collodion cotton.

Cancroine—Solution of neurine in carbolized water, with the addition of a slight amount of citric acid. Also applied to an extract obtained from cancerous tumors.

Cardine—Also written Kardin (in German)—one of the so-called "animal extracts," obtained from beef hearts.

Cerebrine—Another "animal extract," derived from brain substance.

Chelene, also written Kelene, ethyl chloride.

Chloralamide—Chloralformamide.

Chloralose—Condensation product of chloral and glucose.

Chlorol—Solution of corrosive sublimate and copper sulphate.

Chloryle—Mixture of methyl and ethyl chlorides.

Cinnamol—Essence of cinnamon, rectified.

Cocaine phenate—According to Viot and Oefele a mechanical mixture of cocaine and phenol. Poinsot states that it also contains paraffin oil and peanut oil.

Crelium—Cresolated soap.

Cristalline—Collodion cotton dissolved in methylic alcohol.

Disinfectine—Residue of distillation of crude naphtols, mixed with caustic potash and dissolved in water.

Dextrococaine—Isococaine.

Dextrosaccharin—Mixture of glucose and saccharin.

Diabetine—Lævulose.

Diiodoform—Ethylene tetraiodide.

Diuretin benzoate—Mixture of sodic theobromine and sodium benzoate.

Dulcin—See Sucrol.

Emol—Lardite.

Ergotin gallate—Mixture of extract of ergot and gallic acid.

Eulyptol—Mixture of salicylic acid, phenol and oil of eucalyptus.

Ferratine—A preparation of iron, obtained from the hearts of swine.

Formaline—Forty per cent. aqueous solution of formaldehyde.

Formalith—Diatomaceous earth saturated with formaline.

Gallal—Aluminum gallate.

Gallanol—Gallic acid anilid.

Gallobromol—Dibromogallic acid.

Glycine—A photographic developer whose formula is yet unknown.

Hæmostatine—An extract obtained from the thymus of veal, containing sodium hydrate, with the addition of calcium chloride.

Headine—Mixture of acetanilid and sodium bicarbonate.

Iatrol—Oxyiodomethylanilid.

Iodocaffeine—Mixture of caffeine and sodium iodide.

Iodoline—Chloriodide of methylic chloro-quinoline (?).

Iodotheine—The same as iodocaffeine.

Iodotheobromine—Mixture of theobromine and sodium iodide.

Ionone—Odoriferous principle of the orris-root.

Izal—A preparation of cresol.

Kardin—See *Cardine*.

Katharin—Carbon tetrachloride.

Kelene—See *Chelene*.

Lactophenine—Phenacetin in which the acetyl group is replaced by the lactyl group.

Lanaine—Purified wool fat.

Lithium-diuretin—Mixture of lithiated theobromine and lithium salicylate.

Loretin—Iodoxyquinolinosulphonic acid.

Malacin—Mixture of salicylic aldehyde and paraphenitidin.

Methylene—Mixture of 4 volumes of chloroform and 1 volume of methylic alcohol.

Migrainine—Mixture of antipyrine, caffeine and citric acid.

Nasrol—Sodium caffein-sulphonate (name not much used).

Neurodin—Acetyloxyphenyl-urethane.

Oleocreosote—Mixture of etheric creosote and oleic acid.

Oleoguaiacol—Mixture of etheric guaiacol and oleic acid.

Pheduratin—A phenol derivative of unknown constitution.

Phenosalyl—A mixture of phenol and salicylic, benzoic and lactic acids. When first introduced menthol was used in place of benzoic acid.

Pixol—Mixture of caustic soda, wood tar and soap.

Reducine—A photographic developer of unknown constitution.

Resol—Wood tar saponified with potash lye, with the addition of methylic alcohol.

Resorbine—Unguent base, containing oil of sweet almond, wax, gelatin, soap and water.

Resorcylalgine—Condensation product of antipyrine and resorcin.

Resorcinol—Equal parts of iodoform and resorcin heated together.

Retinol—Essential oil derived from resin.

Rhodalin.—Thiosinamin.

Rixolin—Mixture of petroleum and light oil of camphor.

Rosinol—The same as retinol.

Salacetol—Condensation product of acetone and salicylic acid.

Salocol—Salicylate of phenocoll.

Salumine—Aluminum salicylate.

Sanotol—Crude cresol-sulphonic acid.

Sanguinol—A preparation from beef blood of unknown constitution. [Later information states that it contains iron, manganese, and the normal blood-salts.]

Sedatine—Formerly used as a synonym of antipyrine; more recently it has been adopted as the trade-name of para-valerylamidophenetol.

Sequardine—Sterilized testicular extract.

Soltinol—Constitution unknown as yet.

Somatose—Preparation of albumose.

Sodium chloroborate—Effloresced borax treated with chlorine.

Steresol—Alcoholic solution of gum lac, benzoin, tolu balsam, phenol, oil of ginger and saccharin.

Sterilisateur—Aromatic vinegar, containing free hydrochloric, citric and tartaric acids, and saccharin.

Sucrol—Paraphenetolcarbamide. Synonym for dulcin.

Sulphonic ointment—Mixture of lard and concentrated sulphuric acid.

Symphorol—Salts of caffein-sulphonic acid (*e. g.* lithium symphorol is lithium caffein-sulphonate, etc.)

Tannal—Aluminum tannate.

Thermodin—Acetylethyloxyphenyl-urethane.

Thioform—Bismuth dithiosalicylate.

Thiosapol—Soap containing sulphur, chemically combined.

Thiuret—Product of oxidation of dithiodiurate of phenyl.

Tolilantipyrin—Tolypyrin (below).

Tolypyrin—Paratolyldimethyl-parazolone.

Tricresol—Sometimes written *trikresol*, mixture of the three cresols of coal and wood tars, purified to the highest degree—so says Schering, its patentee.

Ulyptol—See *Eulyptol.*

Urethylane—Ethyl-urethane.

Uricedin-Stroschein—Compound containing in 100 parts: 27.5 sodium sulphate, 1.6 sodium chloride, 67 sodium citrate and 1.9 lithium citrate.

Uropherin—Mixture of lithiated theobromine and lithium salicylate. See *lithium diuretin.*

Ursone—Proximate principle of uva-ursi.

Valzine—Synonym for sucrol.

Vaselin, oxygenated—See *Vasogen.*

Vasogen—Vaselin or paraffin emulsionized with water, with the addition of the sulph-oleates.

Vitaline—Solution of borax in glycerin.

Chemical Constitution and the Physiological Action of the New Synthetic Remedies.—V. Coblentz [Alumni Jour. (N. Y.), 1894, 3], considers the relationship. The paper is most replete and exceedingly well executed.

New Remedies.—List of 124 on Notes on New Rem., 1894, 78.

——— Views as to the number valuable.—Ibid., 111.

——— in U. S. P. Comments on the position of the U. S. P. with regard to new remedies.—Ibid., 170.

Abrastol is a sulphonic derivative of beta-naphthol, which is recommended as a food preservative. Dujardin Beaumetz and Stäckler claim that it can be taken in doses of 10 Gm. per day with impunity. It is excreted through the kidneys, and has characteristic and anti-arthritic properties.—Pharm. Post., 1893, 539.

Acetanilid.—R. G. Eccles gives a general historical and therapeutic account of this drug.—Drug. Circ., 1893, 270.

——— is apparently still the favorite hypnotic to administer to children, and various expedients are adopted to reduce the bulk of the dose in these cases. As considerable quantities of wine, whisky or alcohol are necessary to dissolve it, these solvents are objectionable on account of the large bulk of fluid, therefore J. C. McMechan reports that he gives it in mucilage of acacia, according to the following formula, which makes a mixture pleasant to the taste.

Acetanilid	3	Gm.
Mucilage of acacia	40	"
Syrup	40	"

Take 5 Gm. (teaspoonful) every three hours. He cautions to always keep the amount of mucilage the same, even though the hypnotic may be increased or decreased, but the syrup may be reduced if desired.—Squibb's Ephem., 1894, 1458.

Acetogene is a white powder which is used on the continent for the preparation of vinegar. Analysis shows that it does not contain acetic acid. Its composition is as follows:

Acid phosphate of calcium	13	parts.
" " magnesium	2	"
" " sodium	45	"
" " ammonium	40	"
	100	"

—Montreal Pharm. Jour., 1894, 81.

Acetono-resorcin is a chemical combination of 2 molecules of resorcin with one molecule of acetone. It is prepared as follows (*Pharm. Post,* 1894, 122): 1 part of resorcin is mixed with two parts of acetone and 1 part of fuming hydrochloric acid is added while the mixture is heated. The oily product thus obtained is subjected to a prolonged purification process, and appears on the market in small, anhydrous prisms, insoluble in water, alcohol, ether or chloroform, but readily soluble in alkalies. Therapeutic data are yet wanting.

Aceto-orthotoluide.—(See Proc., 1893, 502). Like acetanilid and methylacetanilid, to both of which it is chemically allied, aceto-orthotoluide is an energetic antipyretic. The experiments of Barberini upon animals demonstrate the substance to be almost, if not quite, as energetic as either of the above-mentioned substances, and not nearly so toxic. Up to the present, however, we have but little information concerning the dosage, etc., of aceto-orthotoluide.—Pharm. Post, 1893, 137.

Acidum Agaricum (Laricic Acid) spoken of last year as an effective remedy to check sweating, no doubt has been used in the old country fully as much as the year previous, but practically nothing has appeared in print upon it one way or the other, so that the profession at large can hardly judge of its merits at this time.—Squibb's Ephem., 1894, 1458.

Acidum Carbolicum (*Phenol*).—Phenol has received new prominence over its great rival—corrosive sublimate.—Recent advances, see Squibb's Ephem., 1894, 1459.

Acidum Trichloraceticum Liquefactum.—For general practice a solution of this substance is very much desired, as these very hygroscopic crystals, after opening the bottle a few times, become partly liquefied.—Pharm. Centralh., 1893, 393.

——— Vulpius, according to Suedd. Apoth. Ztg., 1893, p. 302, recommends a solution like that of acid carbolic liq. P. G. III., which is made by liquefying 100.0 Gm. of the crystals at a gentle heat and then adding 10 C.c. of distilled water. The above thus prepared, resembles the fluidity of Conc. Sulphuric Acid very much.

Therapeutic properties: Escharotic; used in venereal and cutaneous affections.

Alphol.—This is a salicylic ether of α-naphtol, and an isomer of "betol," the corresponding derivative of β-naphtol. It is prepared by heating a mixture of sodium salicylate, sodium α-naphtolate, and phosphorous oxychloride, to a temperature of 120° to 130°. Alphol, sodium metaphosphate, and sodium chloride are formed, thus:—

$$2NaC_7H_5O_3 + 2NaC_{10}H_7O - POCl_3 = 2C_{10}H_7(OC_6H_4)CO_2H - NaPO_3 + 3NaCl.$$

The sodium salts are removed by washing with water, and the alphol is then purified by crystallization from alcohol. The compound is said to resemble salol in its therapeutic effects, and to split up into salicylic acid and α-naphthol in contact with the pancreatic and intestinal juices. The dose is from half to two Gm.—(Journ. de Pharm. von Alsass-Loth. and Bulletin Comm., xxii., 85) ; Pharm. Jour. Trans., 1894, 815.

Aluminum Boro-formate.—Martenson suggests the use of this salt—readily soluble in water—in place of alumnol and other analagous preparations, as being of a milder nature, antiseptic in its action, and well adapted for application to the throat.—Pharm. Jour. Trans., 1894, 730 ; from Pharm. Zeitschr. Russland, 1894, xxxiii., 46.

Alumnol.—The doses used ranged from 250 to 500 milligrammes (about 4 to 8 grains) repeated three times a day, but apparently from 2 to 6 Gm. (about 30 to 90 grains) had to be given before any effect was produced.—Squibb's Ephem., 1894, 1463.

Alum Oil.—This is a new substance of an astringent, antiseptic character, and is described as a naphto-sulphate, containing five per cent. of aluminum and fifteen of sulphur. It is a light reddish powder, non-hygroscopic, readily soluble in cold water, this solution becoming cloudy on warming. Upon exposure to the air the powder becomes dark. It is acid, like all the aluminates, in reaction ; it deposits albumin, which is redissolved by an excess of the latter, more particularly the gelatin series. This property is held to be of service in deep purulent discharges. Its antiseptic properties as tested seem favorable.—Med. Press ; West. Drug., 1893, 364.

Amido- and Acetamido-Antipyrine are (*Pharm. Post;* 1893, xxvi, p. 621) two new antipyrine derivatives prepared from nitroso-antipyrine by reduction with zinc and acetic acid, and purified by conversion into the benzilide-compound. Amido-antipyrine crystallizes in beautiful yellow needles and melts at 109° C. ; the aceto-derivate of it melts at 197° C.

Pure Amylene (*Pental*) is obtained by a patented process as follows : Tertiary amyl alcohol is heated on a water-bath with an organic acid, like citric, tartaric or better than these with oxalic acid ; the acid is heated to 60–90° and the alcohol allowed to run in in a steady stream ; the decomposition is effected at once, the amylene distilling off and carrying with it the greater part of the water. The residual oxalic acid can be used repeatedly ; the amylene after washing and fractioning has a constant boiling point of 38°, and is perfectly free from amyl alcohol, foreign hydrocarbons, etc., being especially suitable for therapeutic uses.—Pharm. Centralh., 1893, 431.

Analgen.—(See Proc., 1892 and 1893). Recently declared useless by A. Jacobi in Amer. Therap., 1894, 240. Analgen when previously alluded to here was ortho-oxy-ethyl-ana-mono-acetyl-amido-quinoline, but during the past year it has been found that when benzoyl is substituted for the acetyl in its composition it possesses decided therapeutic advantages, and therefore all that is now prepared contains the benzoyl radicle.

It has been used more largely during the past year and its effects have been carefully studied, particularly in the hospital wards of Germany and France. As much as 5 Gm. (about 75 grains) have been administered daily.—Squibb's Ephem., 1894, 1466.

Richter's Antibenzinpyrin is a specialty manufactured in Bremen, and claimed by the inventor to prevent the spontaneous combustion of benzin as occurring in cleaning establishments, through the electric excitation of the hydrocarbon. This article has generally been ridiculed as a humbug, but now Kissling shows that the claims for the preparation are perfectly justified, and that its property of overcoming electrical excitation in benzin depends on the presence of a magnesium soap. Analysis indicates antibenzinpyrin to consist of about 10 per cent. of some magnesium soap, 60 to 65 per cent. of benzin, and 20 to 25 per cent. of paraffin oil. The editor of the Pharm. Centralh. points out that another preparation, sold for a similar purpose, is sold as antielectron (Nuremburg), and suggests that its composition probably corresponds to the foregoing.—West. Drug., 1894, 180.

"*Antidysentericum*" is the empiric name given to a so-called "specific" against dysentery and acute or chronic diarrhœa. It is reported by Schwarz to be prepared from myrobalans, pelletierine, extract of pomegranate, extract of graminis, and acacia, made into pills; the proportions are not given. Schwarz prescribes 3 pills 3 times a day. For patients that cannot swallow pills, these are reduced to powder; children take ¼–¾ of the adult dose in powder form.—Pharm. Centralh., 1893, No. 39.

Antinervin is stated to be a mixture of two parts of acetanilid with one each of salicylic acid and ammonium bromide.—Drog. Zeit.; West. Drug., 1894, 216.

Antinonnine.—This is a trade-name for ortho-dinitrocresol. It is used as an insecticide for destroying insects on plants and trees. It is also coming into use as a wood preservative, and is employed as other substances of this description, either by painting it on the surface or imbibition.—Drug. Circ., 1894, 36.

Antiphthisine or sozalbumose.—It is prepared as follows: A ½ per cent. solution of cresol is added to a culture of bacillus tuberculosis and filtered. After 24 hours the culture is perfectly sterile. Excess of iodide of bismuth and sodium solution is now added in order to precipitate the toxalbumens. The sozalbumose remains in solution. If this be now warmed with a little caustic soda solution and filtered, all the bismuth is removed. By the addition of five volumes of alcohol the antiphthisine is precipitated. It is then re-dissolved and preserved in water containing .2 per cent. of cresol.—Pharm. Centralh., 1894, 273.

Antispasmin.—It is said to consist of one molecule of a combination of sodium with narceine and three molecules of sodium salicylate. It is a whitish, slightly hygroscopic powder, freely soluble in water and containing 50 per cent. of *pure* narceine—thus apparently freeing the latter from many of its customary unfavorable features.—Squibb's Ephemeris, 1894, 1467.

Antispasmin.—Dose 0.006 to 0.1 Gm. Recommended as a hypnotic and sedative.—Alumni Jour. (N. Y.), 1894, 15.

Antipyrine and its Rivals.—Editorial in Chem. and Drug., 1894, 78.

Antipyrine.—Poisoning cases are still prominent, and promiscuous abuse by too general self-medication among the laity is somewhat on the increase.—Squibb's Ephem., 1894, 1467.

Antirheumatin is the name given by Kamm (Apoth. Ztg., 1893, 597) to a compound of sodium salicylate and methylene blue. It occurs in prisms of dark-blue color, soluble in water and alcohol; its taste is flat, faintly bitter and somewhat acrid after a while, reminding of salicylic acid. Dr. Fischer, of Züllig, recommends antirheumatin in doses of 6 to 10 Cgms., in pills, every 2 to 3 hours. During the use of this remedy the urine is usually blue when voided, turning green on standing; sometimes, however, it is green when passed, in consequence of oxidation within the body.

Antiseptic Sanative Powder (Dr. Koch's).—Consists of alum, 64 per cent.; zinc sulphate, 64 per cent., and a reddish coloring matter.—Chem. and Drug., 1894, 69.

Argentamin.—An antiseptic, employed in gonorrhœa. It is a solution of silver phosphate in aqueous solution of æthylendiamine. In the preparation of this the Scherings have sought to present an antiseptic, which does not precipitate albumen, held in solution in a non-corrosive and non-toxic solvent. It has been found that the antiseptic power of strong alkaline solvents is greater than simple aqueous solution, since the alkalies dissolve the membrane of the micro-organism—as organic bases adapted to this purpose are æthylendiamine and alkyl derivatives, piperazin, etc. As antiseptics, which, in conjunction with these organic bases, do not precipitate albumen, are phenol, cresol, thymol, naphthol, guaiacol and silver salts. The solutions are prepared thus, after the patent: 10 parts of æthylendiamine are dissolved in 500 parts of water, adding 10 parts of freshly dissolved cresol. Where creosote or guaiacol are employed, it is better to use a larger amount of the base (æthylendiamine). For the preparation of the silver solutions 10 parts of silver phosphate (nitrate or chloride) are added slowly, with constant stirring, to a solution of 10 parts of the base in 100 parts of water.—Schaeffer in Apoth. Ztg., 1894, 211; Pharm. Centralh., 1894, 180.

Anytole is the name given to a class of bodies (phenol, hydrocarbons, ethereal oils, camphors, etc.), which are themselves insoluble in water, but which became soluble with admixture of so-called "Anytin." This latter substance is formed by the action of sulphuric acid on various mineral oils, resin oils, and similar hydrocarbons. It is said to be an energetic disinfectant.—Amer. Drug. and Pharm. Rec., 1893, 338.

Asaprol, a soluble derivative of β-naphtol, has been reported upon by Dujardin-Beaumetz and Stackler (Bull. Gén de Thér., July 30 and August 8 and 15, 1893). The authors state that asaprol is the sulphuric ether of β-naphtol in the state of the calcium salt. It is extremely soluble, and in antiseptic power nearly equal to sodium salicylate, than which it is better tolerated, although an intra-venous injection of a solution of asaprol is more poisonous than a similar administration of sodium salicylate solution. The adult dose is usually about 6 Gm., preferably in solution, and acts as an antithermic and analgesic. It is rapidly eliminated in the urine, a test for its presence in which is the appearance of a black coloration, approaching blue, upon addition of a few drops of perchloride of iron.

Asbolin is a new remedy prepared from lampblack, and is recommended by Braconnot for the treatment of tuberculosis. Braconnot boils lampblack with water, then adds hydrochloric acid and extracts with alcohol. He then evaporates the tincture, treats the residue with ether and distills off the latter. The resulting product is a dark-yellow, syrupy liquid. According to Béhal and Desvignes (Phar. Zeit.) this consists principally of pyrocatechin and homopyrocatechin.—West. Drug., 1893, 481.

Aseptol.—L. E. Sayre reviews the history of this antiseptic. The results of L. H. Berguran indicate that carbolic acid has about three times the antiseptic power of aseptol.—West Drug., 1893, 322.

Aurantin.—This is the name given to the substance otherwise known as erasin, thiolin, and abietin, a hydrocarbon derived from the distillation of Pinus sabiana, a native California conifer. This turpentine is prepared exactly as other forms are. The crude oil can be used in the fabrication of varnishes and paint oils. It is light, colorless, possesses an agreeable odor resembling very much that of the essential oil of orange (hence its name). Its vapors have been used as an antiseptic. The boiling point of aurantin lies between 100 and 102° C. According to Thorpe, aurantin consists mainly of normal heptane C_7H_{16}.—Nat. Drug., 1894, 73.

Australite.—A new explosive. Results see Chem. and Drug., 1893, 563.

Benzanilid (Phenyl-benzamide) has been practically unnoticed during the past year.—Squibb's Ephem., 1894, 1470.

Benzonaphtol (β-naphtol benzoate) has apparently shown its reported superiority over betol (salinaphtol) to be well founded. Brück has obtained very beneficial effects in numerous affections of the alimentary tract in children. He finds the best results are obtained after persisting for four or five days. As a rule the movements became practically odorless, and their character changed for the better. His adaptation of dose to the age of the child is as follows:

Under 6 months,	about	200 to 500 milligrammes	3 to 7½ grains.
7 to 12 "	"	400 to 800 "	6 to 12 "
1 to 3 years	"	1 gramme	15 "
4 to 7 "	"	1.3 "	20 "
8 to 14 "	"	2.0 "	30 "

—Ibid., 1471.

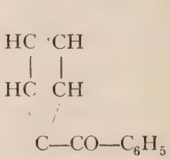
Benzosol (benzoyl guaiacol) continues to be of service in cases of incipient pulmonary tuberculosis, and in fact wherever creosote and guaiacol are applicable. There are poisoning cases on record, but such will always occur with powerful agents, and especially when we know little about their potency. One of the most recent of these unfortunate occurrences was after its administration for diabetes mellitus.—Ibid., 1472.

——— It is a compound which is primarily free from injurious admixtures (cresols), which is further odorless and tasteless, and yet retains all the valuable properties of creosote, and is therefore to be regarded as a real and important step forward in the medical treatment of phthisis. The merit of first effecting it belongs to Dr. Bongartz, the local "Stadtapotheker," who intended shortly to report on the quantitative estimation of guaiacol of creosote and guaiacol of commerce. The product prepared by him is a compound of benzoic acid with pure guaiacol, and bears the name benzoylguaiacol. Under the name benzosol (from benzoylorthooxyanizol) the compound is prepared; when pure it forms a colorless crystalline powder almost free from smell and taste. It melts at 50° C. (uncorr.), and the formula is:

$$C_6H_4\left\{\begin{array}{l}OCH_3\ (1)\\ OCO.C_6H_5\ (2).\end{array}\right.$$

The compound is insoluble in water, difficultly soluble in hot glacial acetic acid, readily so in chloroform, ether and hot alcohol. In the digestive tract it soon splits up into guaiacol and benzoic acid; this decomposition occurs partially in the stomach, but chiefly in the small intestine.—Amer. Drug. and Pharm. Rec., 1894, 32.

Benzo-para-cresol.—Prepared by action of benzoyl chloride on the soda salt of para-cresol. Insoluble in water. Soluble in ether and hot alcohol. Properties antiseptic.—Alumni Jour. (N. Y.), 1894, 15.



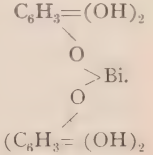
Bismuth Gallates.—A compound of variable composition prepared by adding a solution of bismuth nitrate to solutions of alkali-phenates. A combination of tribromo-phenol and bismuth is said to contain 50 per cent. of the former and practically the same amount of bismuth oxide. It is a yellow insoluble powder of neutral reaction without taste or odor, almost non-toxic and without action upon the lining of the digestive organs. Hueppe considers it a specific against cholera (Pharm. Centralh., 1893, 237). F. Jasenski has experimented with similar compounds, phenol-bismuth, cresol-bismuth and β-naphtol-bismuth, and in doses of 1 to 3 grammes they are useful in chronic and acute intestinal catarrhs.—L'Union Pharm., xxxiv, 354; Pharm., Jour. Trans., 1893, 183.

Basic Organic Bismuth Salts can be made by taking advantage of the solubility of bismuth chloride in a 25 per cent. solution of sodium chloride or other alkali chloride and adding the organic acid to this solution. Basic bismuth gallate: 100 Gm. bismuth chloride are dissolved in 1,800 Gm. sodium chloride solution (25 per cent.), filtered, 400 Gm. gallic acid added, boiled for 20 minutes, replacing the evaporated water, and pouring into an excess of water sufficient to retain in solution the excess of gallic acid; the precipitate is washed and dried; the product contains 49.2–50 per cent. bismuth and corresponds to the formula $C_6H_2(OH)_3COOBi(OH)_2$.

Basic Bismuth Pyrogallate: 150 Gm. pyrogallol are dissolved in 650 Gm. of water and 316 Gm. bismuth chloride are dissolved in 1,000 Gm. solution of sodium chloride (25 per cent.); the filtered solutions are mixed, heated for one-half hour in a water-bath and poured into such a volume of water (about 20 volumes) that precipitation of the basic salt commences; after some time the precipitate is collected, washed with water until the acidified washings cease to react with silver nitrate; the product, apparently, has the formula $C_6H_3(OH)O_2(BiOH)$.—A. Voswinkel, Pharm. Ztg., 1893, 594.

Bismuth Phenates.—The firm of Von Heyden made the discovery that those bodies belonging to the group of phenols (carbolic acid, cresol, naphtol, pyrogallol, etc.) unite with bismuth, thereby losing their toxic properties. They are indifferent to the stomach, insoluble in water, alcohol and ether. They are retained by reaction between the alkali salts of a phenol and the inorganic salts of bismuth. Among these pyrogallol bismuth is of interest. Pyrogallol itself, because of its intensely poisonous nature, is not employed internally, and only externally with great caution; the bismuth compound is almost non-toxic, and is a valuable antiseptic in treatment of intestinal diseases—also useful in skin disease.

Von Heyden's patent salt contains 50 per cent. of bismuth oxide, the formula being expressed thus:



$$\begin{array}{l} C_6H_3{=}(OH)_2 \\ \quad\diagdown \\ \quad\; O \\ \qquad > Bi. \\ \quad\; O \\ \quad\diagup \\ (C_6H_3{=}\,(OH)_2 \end{array}$$

It is a yellow powder, insoluble in water and alcohol, soluble in caustic soda solution (different from all known bismuth salts) and hydrochloric acid. Must be free from subnitrate or oxychloride of bismuth.—Alumni Jour., 1894, 88.

Bismuth Salts.—Basic bismuth salts are generally prepared by decomposing the normal salts with much water, whereby compounds of definite chemical composition do not result. Basic bismuth salts of constant composition are prepared by the action of the respective acid on freshly precipated bismuth hydroxide (both are used in theoretical quantities).

Bismuth Salicylate is prepared by dissolving 1 molecule (486 parts) crystallized bismuth nitrate in nearly 4 times its weight of dilute acetic acid. The solution is then diluted with about 40 times its volume of water, and precipitated with ammonia in the cold. The precipitate is washed by decantation until free from nitrate, and brought into a porcelain dish and 1 molecule (138 parts) of salicylic acid added. The mixture is heated on a water-bath, and after combination is effected the water is separated by suction, the salicylate dried first on porcelain tiles, and finally in an air-bath at 70 to 75° C. The reaction is expressed by the equation:

$$Bi(OH)_3 + HC_7H_6O_3 = BiO.C_7H_5O_3 + 2H_2O.$$

The basic salicylate so prepared is a white, dry, light powder, and when examined under the microscope shows prismatic crystals.

Bismuth Subgallate, $C_6H_2(OH)_3CO_2.Bi(OH)_2 + H_2O$, is prepared as above by using gallic acid in place of salicylic acid. The resulting preparation has a beautiful sulphur-yellow color, is absolutely free from nitrate and other impurities, and completely soluble in a solution of sodium hydroxide.—B. Fischer and B. Grützner in Arch. Pharm., 1893, 261, 680 and 685.

Bismuth Beta-Naphtolate is claimed by Hueppe to be the best intestinal antiseptic yet discovered, with the exception of bismuth tribromphenate. It occludes 80 per cent. of bismuth oxide, and is said to be equally as efficient in choleraic diarrhœas as in those of non-specific origin. Its virtues in this direction are vouched for by Nencki, Schubenko, and Blachstein. It appears as a brown, neutral, inodorous, non-astringent powder, insoluble in water, but which is decomposed by the gastric fluid into a beta-naphtol, which may be recovered from the urine, and into bismuth, which is eliminated in the stools. The dose is from 1 to 2 Gm. in the course of twenty-four hours.—Pharm. Centralh., 1894, 84.

Bismuth Tribromphenate.—Heger presents a yellow, neutral, inodorous, and tasteless powder, and states is occludes 50 per cent. of tribromphenol and 49.5 per cent. bismuth oxide. He claimed it to be the most energetic remedy yet discovered against all intestinal sepsis of bacterial origin, but especially against cholera, exceeding in this respect tribromphenol, which has hitherto held front rank as a bactericide. The new remedy seems to have no action on the mucosa of the intestinal tract. It is administered in doses of 50 Cgm., repeated up to as high as twelve to fifteen times in the twenty-four hours.—Ibid., (See also Hueppe in Berl. klin. Wochenschr., 1893, No. 7; and M. F. A. Jasenski in Archiv. Scien. Biol., Vol. II., No. 2).

Bismuth Salicylate.—Analyses by F. Goldman, in Pharm. Zeit., 1893, 206, 385.

	Free Salicylic Acid and Moisture.	Bismuth Oxide	Bismuth Subnitrate.
Merck	0.11 p. c.	63.23 p. c.	--
Schering	0.58 "	62.42 "	——
Riedel	5.07 "	57.84 "	11.93 p. c.
Heyden	0.74 "	72.34 "	——
Radlauer	1.35 "	66.38 "	20.20 p. c.
Gehe & Co	0.28 "	67.39 "	——

Bismuth and Sodium Iodide, $BiI_3.4NaI$, occurs in red crystals, which are decomposed by water with the separation of bismuth oxyiodide, and are soluble only in diluted acids.

Bismuth Sulphocarbolate is a powder of faint-red color, and soluble in water. Pharmacologic and therapeutic experiments with this salt (which is said to possess antiseptic properties) have not as yet been made.

Bismuth Pyrogallate or Pyrogallol Bismuth.—The process, which is patented, is based on the double decomposition of an alkali phenate and a solution of nitrate of bismuth. The resulting compounds are neutral, non-irritating, insoluble in water, alcohol or ether, and non-poisonous. Pyrogallol-bismuth is a yellow powder and differs from all other bismuth salts in being soluble in soda solution. It is expected to become an important agent in dermatology and gastro-intestinal disorders.—West. Drug., 1894, 97. See H. Cousse, in Compt. rend., 1893, 232.

Boro-salicylic Acid Solution, introduced by Cesaris and Carcano as an antiseptic, contains in every litre 4 Gm. each of boric and salicylic acids. Its therapeutic value has recently been tested in an Italian hospital, it is reported (Bull. Chim. Pharm., 1893), and found superior to that even of corrosive sublimate. The addition of the boric acid renders the salicylic acid solution more permanent.

Butyl-Hypnal is the name given to the new compound formed by the combination of butyl-chloral and antipyrine. Bernin describes it as being in the form of light colorless crystals, with an odor like butyl-chloral, and a bitter taste. It is only soluble in thirty parts of cold, but very soluble in hot water. Most of the other prominent solvents dissolve it quite readily. It is analogous to hypnal, but its therapeutic effects are unknown as yet.—Squibb's Ephem., 1894, 1477.

Calcium Glycerinophosphate, $CaC_3H_7PO_6$, is described by G. de Pasqualis as a white, crystalline powder, easily soluble in cold water—the solution becoming turbid on being heated, but almost insoluble in boiling water. According to the author's investigations, lecethin—the chief phosphorous constituent of food—is decomposed, during digestion, into choline and glycerinophosphoric acid. The latter thus represents the form in which phosphorus is assimilated, and is indicated when it is desired to augment the proportion of phosphorus in the organism. Both glycerinophosphoric acid and its calcium salt are reported to be well borne; definite dose statements, however, are not given.—Merck's Bericht, 1893.

Calcium Phosphoglycerate.—L. Portes and G. Prunier describe a process for preparing this compound. Phospho-glyceric acid is first prepared by maintaining a mixture of liquid phosphoric acid and glycerin at a temperature of 100° to 110° for six days. After cooling, calcium carbonate is added until the acid is neutralized. The precipitate formed is dissolved in cold water, and the solution filtered and evaporated at a low temperature. The product is a white, slightly crystalline powder, which is soluble in fifteen parts of cold water, almost insoluble in boiling water, insoluble in alcohol, and gives but a faint reaction with ammonium molybdate.—Jour. Pharm. Chim., xxix., 393.

Caffeine Chloral.—A mixture of the two in molecular proportions. Administered hypodermically in doses of 0.2 to 0.4 Gm. in relieving habitual constipation.—Alumni Jour., 1894, 15.

Caffein-Sulphonic Acid.—This body is being prescribed as a diuretic. It is slowly soluble in cold water, easily so in hot water. It possesses less activity on the nerve centers than caffeine. It is being sold under the name of "Nasrol" as a sodium salt.—Pharm. Zeit., 1893, 787.

Camphopyrazolon.—A new remedial agent patented in Germany, has the formula $C_{17}H_{20}ON_2$, and is obtained by heating together ethyl camphocarbonate and phenylhydrazin. It is said to be similar in action to methylphenylpyrazolon.

Carbolate of Camphor.—M. B. Cochran prepares this by adding 1 part by weight of carbolic acid to 3 parts of camphor, setting it aside for 24 hours, and straining through gauze. It is a permanent liquid, sp.gr., 0.900. It is thoroughly antiseptic. It combines readily with alcohol, ether, fixed and essential oils and petroleum derivatives, but not with aqueous solutions or glycerin. It readily dissolves menthol, cocaine, salicylic acid, iodoform, chloral hydrate and mercuric chloride.—Therap. Gaz.; West. Drug., 1893, 325.

Cannabindon, $C_8H_{12}O$, is the name given by R. Kobert (Chem. Ztg., 1894, 741), to a substance obtained from Cannabis indica. It is a syrupy body of a beautiful dark-cherry-red color, completely soluble in alcohol, ether, chloroform, benzene, xylol, tolulol, nitrobenzene, acetone, aldehyde, amylic alcohol, turpentine oil and fatty oils. Both its ethereal and alcoholic solutions react neutrally to litmus, burn with a strongly sooting flame, and leave 0.4 per cent. of ashes. When cannabindon is treated with fuming sulphuric acid, on the water-bath, until its color changes from dark-red to blackish-brown, it becomes entirely soluble in water, and resembles ichthyol both in color and odor. The action of cannabindon was tested on men and cats. Even doses of 2 centigrammes (⅓ grain) have a narcotic effect on some persons, while in certain refractory individuals the dose must be increased to 8 centigrammes [1⅓ grains], to have the same action. The effect does by no means consist in sleep, but the intoxication is revealed in hallucinations, which are not always agreeable. When applied repeatedly, the remedy becomes a means of sensual enjoyment, similarly to tobacco. Therapeutic data are yet wanting.

Carbolic Powders.—Composition of powders obtained from various makers.—Brit. and Col. Drug.; reprinted in Drug. Circ., 1894, June.

Chloralose—A Derivative of Chloral and its Physiological Properties.—Hanriot and C. Richet (Compt. rend., 1893, 63).

Equal quantities of anhydrous chloral and dry glucose are heated together at 100° C. for an hour, and the cooled product is mixed with a small quantity of water and extracted with boiling ether. The portion soluble in ether is distilled repeatedly with water until all chloral is expelled, and the aqueous solution is then subjected to fractional crystallization; in this way the anhydroglucochloral, which has already been described by Heffter, and which the authors propose to call *chloralose*, is obtained in two forms, namely, chloralose, which crystallizes in slender needles melting at 184–186° C., and volatilizing without decomposition, and *parachloralose*, which crystallizes in nacreous lamellæ melting at 229° C. The latter is soluble with difficulty even in hot water. Both substances have the composition $C_8H_{11}Cl_3O_6$.

Chloralose with sulphuric acid yields a disulphonic derivative, and with acetic anhydride a tetracetyl derivative. Contrary to the statement of Heffter, it does not yield glucose when treated with potassium hydroxide.

Parachloralose, probably by reason of its insolubility, is without physiological activity, but chloralose, when administered by ingestion, produces hypnotic effects, and at the same time increases the excitability of the spinal marrow. When given to dogs in the proportion of 0.6 Gm. per kilogram of body weight, it produces only anæsthesia, and not death. The hypnotic effect begins to be evident with doses so small as 0.02 Gm. per kilogram of body weight, and hence, chloralose is much more active than chloral, and its effect cannot be attributed to a decomposition into chloral. When administered to human beings in doses of from 0.2 Gm. to 0.75, but not exceeding 1 Gm., it acts as a valuable hypnotic, producing no disturbance of digestion, no cephalalgia, and no phenomenon of intoxication.

——— Furthur notes on its manufacture, by A. Percy Smith, in Chem. and Drug., 1894, 131.

"*Chlorol*" is a new French disinfecting fluid, having the following composition (Arch. Méd. Belge.): Corrosive sublimate, sodium chloride, and hydrochloric acid, of each 1 part; copper sulphate, 3 parts; distilled water, 1,000 parts. The sodium chloride is added for the purpose of rendering the solution more stable; the hydrochloric acid to prevent the decomposition of the corrosive sublimate in presence of albuminoid matter; and the copper sulphate for its vomitive effects—in case the chlorol should be taken internally by mistake.

Chloral Alcoholate may be detected in chloral hydrate by the following method: Pour 1 C.c. of nitric acid (spec. gr. 1.38) over 1 Gm. of the suspected chloral hydrate. At the ordinary temperature or on warming, no yellow color or yellow fumes should be developed within 10 minutes. One per cent. of alcoholate may be detected by this method.—E. Hirschsohn, Chem. Ztg. (Rep.), 1894, 19.

Copraol.—Mayenburg (Pharm. Zeit., 1894, 390), examined this fat obtained from palm-nut oil. It is yellowish-white in color, without odor and taste, M. P. 30.3° C., chills at 28° C. It is a pure fat and may be used in place of cacao-butter.

Cornicide.—Lanolin forms the basis of another salicylic-acid plaster, and cocaine is added with the idea of making it painless. To form the plaster, mix 6 dr. of salicylic acid with 10 dr. of lanolin. Dissolve 5 grains of hydrochlorate of cocaine in a small quantity of warm alcohol, and mix the solution with 1 fluid ounce of creosote. Mix ½ ounce of melted white wax with ½ ounce of vaselin, and add the creosote solution. To this add the cocaine solution and mix.—St. Louis Clinique; Amer. Drug. and Pharm. Rec., 1893, 276.

Crelium, or "sapol ai cresolo," appears to be similar to the well-known cresol soap mixtures (creolin, lysol, etc.).—Pharm. Centralh., 1893.

Cresol Solutions as Antiseptics—Creolin (Artman), Sanatol.—Cresol sulphonic acids, made from crude cresol and sulphuric acid.

Saprol—Mixture of crude cresol with high-boiling oils.

Creolin, Pearson, Disinfected Izal, Iaporcarbol II—Mixtures of resin with crude cresol.

Kresol, 50 per cent. soluble, *Kresol* (Raschig), *Kreaspol, Kresol saponat., Lysol, Phenolin, Japocarbol, Liquor Cresoli Saponatus*—Mixtures of crude or pure cresols with soap solutions, in most cases 50 per cent. cresol and 50 per cent. potash soap solution (Lysol, Liq. cresoli saponatus, etc.).

Aqua cresolica, cresol water—Mixtures of 1 part liquor cresoli saponatus with 9 parts water—amount of cresol 5 per cent.

Solutol—Mixture of cresol and cresol soda (cresol 50 per cent.).

Solveol—Mixture of cresol with cresylate of soda (cresol 25 per cent.).

Tricresol—Mixture of 3 cresols from tar oil.—Pharm. Centralh., 1894, 102.

——— H. Nördlinger (in Apoth. Zeit.; Pharm. Jour. Trans., May, 1894), considers the history and value of these preparations.

The Solubility of the Different Cresols in water, according to M. Gruber, expressed in volume, per cent., is as follows: ortho-cresol, 2.5; meta-cresol, 0.53; para-cresol, 1.8; cresol mixture from toluidin, 2.2; and the same from tar, 2.55.—Pharm. Centralh., 1894, xxxv., p. 37.

Creosotal is the carbonate of creosote, containing 90 per cent. of pure creosote, rich in guaiacol; it is a thick liquid and has a neutral reaction; is insoluble in water, but soluble in four or five parts of cod-liver oil or olive oil. The daily dose for a child is 1–6 Gm., and 4–15 Gm. for an adult. It can be made into an emulsion by beating ½–2 teaspoonfuls with the yolk of an egg and diluting with sweetened and aromatized water.—Jour. de Pharm. d' Anvers., 1893, 415.

Cristalline is a kind of collodion, in which the ether and alcohol, employed as solvents for pyroxylin, are replaced by methyl alcohol. It differs from collodion, in that the solvent evaporates more slowly, and in forming a transparent film, which allows the part it protects to be seen and the progress of the treatment followed. An elastic cristalline can be obtained by adding 20 Gm. cristalline to 5 Gm. castor oil and 10 Gm. Canada turpentine. Cristalline dissolves pyrogallic and salicylic acids, chrysarobin and many other medicaments. The only disadvantage of its use is its odor.—Sem. Médicale, Oct. 18, 1893; Rép. de Pharm., 1893, 497; Pharm. Zeit., 1893, 754.

Modified Cristalline.—E. Thibault (Sem. Méd., 1894, 70), proposes a modification of Phillips' formula for cristalline:

Pyroxylin	1 part.
Methylic alcohol	4 parts.
Amyl acetate	15 "

This is used similarly to the original cristalline.

Depilitant.—Leistikon (Monatsh. f. prak. Dermat., 1894, 233), recommends the well-known barium sulphide paste, which is prepared by forming a paste of barium sulphate, charcoal, sand, linseed oil; this is then heated to redness for some time in a crucible, yielding a dark-blue barium sulphide. Then mix the following:

Barium sulphide, fine powder	10 parts.
Zinc oxide, fine powder	5 "
Starch, fine powder	5 "

When used it should be mixed with sufficient water to form a soft paste, then applied to the parts; as soon as dry (10 min.) it is washed off.—Alumni Journal (N. Y.), 1894, 88.

Diabetin is a new product, offered as an innocuous and palatable sugar, for the use of diabetic patients. It is a saccharine body, nearly or possibly identical with fruit sugar, levulose; however, the manufacturers state that this point has not been proven. It has been claimed that levulose has never been found in the urine, although it is an ingredient of cane sugar, which is freely partaken of by most people every day. When a certain quantity of levulose is introduced into the system of patients suffering with grave or mild forms of diabetes, the absolute amount of sugar is not materially increased, while the introduction of dextrose or grape sugar and the amylaceous articles of food increases the sugar in the urine to a considerable extent. It is a white granular mass, which is soluble in water in almost every proportion, which gives it a decided preference over saccharin. It has a pure, sweet taste, similar to that of sweet fruit, and is said to have sweetening power considerably greater than that of cane sugar, and can be used as a means of sweetening all the various kinds of foods and drinks for diabetics, and possesses the same nutrient value as cane or beet sugar, while it can be assimilated, and for the greater part made use of by the system of diabetic patients.—Registered Pharm., 1892, 305.

Diabetin.—Value of from a therapeutic standpoint by Dr. Leyden.—Pharm. Era, 1893, 155.

Diaphtherin as an Antiseptic Dressing Material.—Klecki has examined the comparative antiseptic action of various drugs on the Staphylococcus aureus, and has found that the vitality of the microbe is destroyed by a 1 per cent. solution of carbolic acid, creolin, and thymol; a 3 per cent. solution of aseptol; a 0.3 per cent. solution of boric and salicylic acid; a 5 per mille solution of salicylic acid and of lysol; and a 2 per mille solution of diaphtherin. The author recommends diaphtherin as a most valuable antiseptic agent, which possesses the great advantage of never causing any exanthemata and being altogether free from any toxic properties.—Gazeta lekarska, 1892, No. 34; Universal Med. Journ., Jan'y., 1893; See, also, Squibb's Ephem., 1894, 1485.

Diaphthol is the name given by Dr. L. Guinard (Lyon Méd., 1894, 21) to Orthoxyquinoline-metasulphonic acid (Quinaseptol). It occurs as yellowish white crystals or powder difficultly soluble in cold water, and melting at 295° C., with ferric chloride it yields a beautiful green coloration. The author found diaphthol to be possesed of considerable antiseptic power, and to be practically non-toxic. In a dog weighing 16 kilogrammes, 3 Gm. produced only a slight fall of temperature, without any other inconvenience. The urine was yellow, and kept for several days without putrifying. This fact induced the observer to study the internal antifermentative action of the remedy. It was found that the urine of animals ingesting diaphthol, rarely underwent ammoniacal decomposition, not even when impregnated with the micrococci of such a fermentation. The remedy was readily tolerated by the gastro-intestinal mucous membrane; and the author is of the opinion that diaphthol is destined to occupy a prominent position in internal antisepsis, especially of the genito-urinary organs—since it is scarcely toxic, has great antifermentative power, and is eliminated totally and unchanged. Clinical reports are expected at an early date.

Di-iodoform ($C_2H_4I_4$)—*Syn.: Ethylene-tetraiodide.*—Occurs in form of yellowish-white, prismatic needles; almost odorless, but on exposure to the air it takes on a characteristic odor and turns to a brown color; insoluble in water, sparingly soluble in alcohol and ether; melting point 192° F.—A substitute for iodoform, containing 95.28 per cent. iodine—a larger proportion than any other iodoform substitute. Has been used and reported on favorably to a limited extent. It is rather too expensive to achieve popularity.

Diphthericide is the name of a preparation recommended by J. Bergmann (Münch. Med. Woch.; 1894, 79), as a prophylactic against diphtheria. It comes in the form of pastilles, prepared from a viscous, gum-like mass consisting mainly of guttapercha and gum damar. The tablets may be chewed for a long while, like ordinary chewing gum—the active constituents thus passing quite gradually into the saliva. Each pastille contains 2 milligrammes [1/32 gr.] of thymol, 2 centigrammes [1/3 gr.] of sodium benzoate, and 1½ centigrammes [¼ gr.] of saccharin. Three or four lozenges are to be chewed daily, in all catarrhal affections of the pharyngeal mucous membrane in children, during which the latter are specially prone to become infected with diphtheria on the slightest exposure to the anginal poison.

Disinfectin.—The name (Pharm. Zeitschr. f. Russl.) of a preparation inintended for ordinary disinfection, said to be obtained as follows: 5 parts of the residue left in distilling crude naphtha are thoroughly mixed with 1 part (by volume) of concentrated sulphuric acid, and allowed to cool. The fluid portion is separated from the sediment, and gradually mixed with an equal volume of 10 per cent. soda solution, and well shaken. Thus is obtained a yellowish-brown emulsion—disinfectin—which when intended for use, is diluted with four parts of hot water, and thoroughly shaken.—Amer. Drug. and Pharm. Rec., 1893, 276.

Diuretin.—According to Pawinski (Gaz. lek., Jan., 1893, through Nouv. Rem., 1893, 253), who studied its action in more than 50 cases, it does not regulate the cardiac nerves like digitalis, but still regulates the pulse indirectly, in augmenting diuresis and diminishing œdema; it retards the heart-beats, and increases the blood pressure, and while it is inferior to digitalis or caffeine, it has undoubted diuretic properties; the secondary effects, however, such as headache, a buzzing in the ears, somnolence (in patients of advanced age) or insomnia being less pronounced than after the administration of caffeine. The author prescribes it in daily doses of 3–4–5 Gm., preferring it in the form of a solution, the powder becoming insoluble, by reason of the precipitation of theobromine caused by its combination with the carbonic acid of the atmosphere.—Amer. Jour. Pharm., 1893, 389.

——— Summation of therapeutical effects by J. B. Herrick in Pharm. Era, 1893, 107.

Dulcin.—Identical with sucrol (Am. Jour. Pharm., 1893, 288) has the melting point 173–174° (not 160° C.); the solubility in water of 15° is 1 in 800, at 100° C. it is 1 in 50; in alcohol of 90 per cent. 1 in 25. Tests for purity are: (1) colorless crystals; (2) melting point; and (3) colorless solution in cold, concentrated sulphuric acid.—H. Thoms, Pharm. Centralh., 1893, 281 (See Squibb's Ephem., 1894, 1488).

Detection of Dulcin in Liquids.—Dulcin (*p*-phenetolcarbamide) may be detected, according to Morpurgo, in wines, syrups, and other liquids by the following process:] Add to the suspected liquid 5 per cent. of its weight of carbonate of lead, and after thoroughly mixing, place the mixture in a water-bath and evaporate to dryness. Exhaust residue with absolute alcohol, and after uniting the alcoholic charges, evaporate them to dryness and extract the residue with ether. Filter and evaporate the ether, and the residue, if any, will be almost chemically pure dulcin, which is easily recognizable by its physical peculiarities, chief among which is its intensely sweet taste. If, however, it is necessary to make a chemical demonstration of the identity of the substance and dulcin, proceed as follows: Mix a small quantity of the substance with 2 drops of phenol and a like quantity of sulphuric acid, and dilute with a few cubic centimeters of water. Cool the mixture and add very carefully, a drop at a time, a few drops of ammonia or sodium hydrate solution. If the substance is dulcin, a blue or violet zone will develop at the plane of junction of the two liquids. —Nat. Drug., 1894, 27.

Dulcin Reactions.—Neumann-Wenalen gives the following: If to a portion of dulcin, in a porcelain capsule, fuming nitric acid be added, a violent reaction is at once set up, and a fine orange-yellow coloration is developed. If the product thus obtained be heated to dryness in a water-bath, a resinous orange-yellow residue is obtained, which is soluble in alcohol, ether and chloroform. If a portion of this resin be rubbed up with a mixture in equal parts of phenol and concentrated sulphuric acid, the color changes to a blood-red, which is very constant, and may be exposed to the air for a considerable length of time without fading.—Pharm. Post, 1894, 233.

Caution Regarding Dulcin.—G. Aldehoff writes to the Therapeutische Monatshefte, cautioning physicians against the indiscreet use of dulcin, the new sweetening agent. One gram pro die, administered to dogs, produced vomiting, loss of appetite, apathy, and progressive emaciation. The urine underwent radical modification. Aldehoff accordingly objects to the not unusual doses of 0.5 to 1.0 Gm. as dangerous to the health.—Drug. Circ., 1894, 129.

Dulcitol.—E. Kremers examined black ash (Fraxinus sambucifolia) and finds it to yield dulcitol, the stereo-chemical isomer of mannitol obtained from white ash (F. Americana). The white ash did not yield any volatile oil.—Pharm. Rund., 1893, 158.

Eczemin is a poisonous ptomaine isolated by Griffiths (Deutsch. Med. Ztg.: 1893, 582) from the urine of eczematous patients. It is described as a white, crystalline substance, soluble in water with feebly alkaline reaction; it is precipitated by phospho-molybdic acid (yellowish), silver-nitrate, picric acid (yellow), corrosive sublimate (greenish), and Nessler's reagent. The composition of eczemin is said to be represented by the formula $C_7H_{15}NO$; it does not occur in the urine of healthy persons.

Emol.—This is the discretional name given after purification, to a natural product fouud near Dunning, in Perthshire. It is allied to "Fuller's earth," yet is distinct from all the market varieties of that material. It contains steatite and minute traces of lime and iron. As purified it is a soft, impalpable powder with a pinkish tint. It softens hard waters and is a detergent. It is suggested in the form of a paste to be useful in removing horny accretions on the palms and on the soles. It also possesses antipruritic power.—Brit. Med. Jour., 1704, 473; Pharm. Jour. Trans., 1893, 183.

Emulsin, recently introduced in France as an emulsifier, is defined (Journ. d. Pharm. v. Els.-L., 1894, p. 128) as a paraffin oil oxidized under pressure. It presents a neutral, inodorous, oily liquid, forming with water a stable, milky solution. In its properties it thus seems to resemble vasogen. It is unfortunate that this name should have been chosen for a new substance, when it has been applied for years to a peculiar ferment obtained from almonds.

. *Ethyl Bromide* has increased in use during the past year.—Squibb's Ephem., 1894, 1489.

Ethyl Chloride.—H. R. Crocker found the inhalation of vapor not altogether free from danger. It has, however, met with much success.—Squibb's Ephem., 1894, 1490.

Euchlorin is the name given by L. D. L. Ellis (Pharm. Ztschr. f. Russl., 1894, 183) to a solution of ½ to 2 Gm. of potassium chlorate, 10 drops of hydrochloric acid, and 240 Gm. of water. It is alleged to have been very successfully employed against diphtheria, in forms of gargles, sprays, and paints. It is claimed that in one case complete cessation of the exudative process was obtained in 24 hours by using euchlorin as a gargle. The author says he has cured with this remedy over 200 cases (!) but never noticed any disturbance from its use. As a rule, he allows a few drops to be swallowed during gargling. Sometimes, as with children, it is advisable to dilute the euchlorin and to modify the taste of the fluid by the addition of glycerin and alcohol. To children as yet unable to gargle, he administers a few drops every half-hour, and applies the remedy locally in spray form.

Eugenol Iodide is a compound analogous to aristol, and is obtained (Giorn. di Chim. e Farm.; 1893, No. 9) by treating alkali solutions of eugenol with iodine—8.2 kilos of eugenol are dissolved in 700 litres of water, and 2 kilos of sodium hydroxide and 2.7 kilos of sodium carbonate are added. Then 12–13 kilos of iodine and 18 kilos of potassium iodide are dissolved in 60 litres of water, and mixed with the first solution. The resulting precipitate is gathered and recrystallized from alcohol or benzin. The finished product is a colorless to yellowish, tasteless powder, which is insoluble in water, melts at 150° C. and decomposes at a higher temperature with the liberation of iodine—Definite therapeutic data are yet wanting.

Euphorin (*Phenyl-Urethane*).—Summary of results of its application by G. Cao, and others in Squibb's Ephem., 1894, 1493.

Europhen (*Diiso-butyl-ortho-cresol iodide*).—*Test for.*—The German Pharmacopœia Commission state as a test for the purity of europhen, that when europhen is agitated with water and silver nitrate added to the filtrate, it should not show cloudiness. According to this test all europhen would have to be refused which was not indifferent to silver nitrate solution. Felix Goldmann pointed out some two years ago, however, that europhen contains traces of free iodine, and that on contact with water, water-soluble organic compounds were formed. Every sample of europhen after it had been mixed with water would, therefore (though not after merely agitating), yield a filtrate which reacts upon silver nitrate. These are not impurities but merely substances which serve to aid in the efficacy of the product. Goldmann therefore proposes the following test: To identify europhen boil it for ten minutes in alkaline solution with zinc dust and thus split up into its components. Dilute, filter, add an excess of acid to the filtrate and agitate with ether. Estimate the iodine in the aqueous solution in the usual manner. Drive off the ether from the ethereal solution, take up with a little soda solution diluted with water and add iodine and potassium iodide solution, or what is better iodine in the nascent state, potassium iodide and sodium hypochlorite. Europhen is thus regenerated and may be identified by the precipitate that forms greenish at first, and later yellowish, and by the characteristic odor. —Ibid., 89.

Europhen.—Neuberger in Monatshefte für praktische Dermatologie, Volume xvii, No. 8, gives a report of the experience which he, in connection with Oefelein, has had with europhen. Almost two hundred cases have been subjected by them to europhen treatment. Europhen is odorless, unirritating, and has proven serviceable in balanitis, herpes praeputalis, ulcus molle, etc. It is used as powder or ointment; in order to prevent retention or secretion, it is often advisable to apply the ointment over the powder.

In syphilis, Oefelein and Neuberger have frequently used injections of Europhen, and obtained good results. Eichhoff, who was the first to recommend injections, has abandoned their use, it is true. In general europhen is a good remedy, adapted for many conditions, and can be earnestly recommended.—Amer. Therap., 1894, 290.

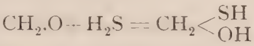
Europhen.—Kopp's experience with europhen in venereal diseases.—Therap. Monats., March, 1893 (See, also, Squibb's Ephem., 1894, 1494).

Exalgin for Hypodermic Injection.—P. Cesaris (Bol. Chim. farm., 1894, 69; Apoth. Zeit., 1894, 172). The sparing solubility of this substance (1 in 48) has been hitherto an obstacle to its use by hypodermic injection. It is stated that it is readily dissolved by a solution of sodium salicylate, and he gives the following formula for the purpose:

Exalgin	1.0 part.
Sodium salicylate	1.1 part.
Distilled water	10.0 parts.

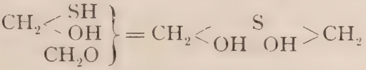
Ferratin.—An artificial iron-albumen food is made from egg-albumen and an iron salt in the presence of an alkali; it contains .7 per cent. iron; it is a red-brown powder, almost odorless and tasteless; dose for adults 0.5 Gm. three to four times daily.—Pharm. Ztg., 1893, 762: also, Rép. de Pharm., 1894, 21.

Formalin as a Deodorizing Agent.—Schmidt has observed that on adding formalin to putrified meat broth the offensive odor immediately disappears. The same effect is produced on adding formalin to putrid urine. The smell of fæces is also destroyed by formalin. Further inquiry as to the chemical nature of the change thus produced showed that when a solution of sulphuretted hydrogen is shaken with a sufficient quantity of formalin, the odor of the gas disappears and is replaced by a faint alliaceous smell, and it is suggested that the reaction taking place may be represented by the following equation:—



$$CH_2.O + H_2S = CH_2{<}\begin{matrix}SH\\OH\end{matrix}$$

or when there is sufficient excess of formalin to remove the mercaptan smell—



$$\left.\begin{matrix}CH_2{<}\begin{matrix}SH\\OH\end{matrix}\\CH_2O\end{matrix}\right\} = CH_2{<}_{OH}\overset{S}{}_{OH}{>}CH_2$$

Methylmercaptan, $CH_3.SH$, which is, according to Nencki, the chief cause of the odor of fæces, is rapidly decomposed by an excess of formalin. Ammonia and ammonia bases are immediately converted into inodorous products. Skatol is not acted upon by formalin unless hydrochloric acid is added, and then it is converted into an odorless product insoluble in water. In this respect synthetic skatol differs from its isomer methylindol, which is immediately acted upon by formalin.—Pharm. Zeit., 39, 56.

Formol.—Under this name a preparation is introduced which is formic aldehyde CH_2O. Trillat has performed numerous experiments on its bactericidal properties.—Jour. Pharm. Chim., 1894, 537.

Uses of Formic Aldehyde.—This is apparently increasing in value as an antiseptic. J. Holfert now suggests its use in a 0.5 per cent. solution as a preservative of vegetable products. It causes the object to shrink and harden as does alcohol, but chlorophyll and other vegetable pigments are not affected by the solution. As an instance of the great disinfecting power of formic aldehyde, it was stated that the faint smell of butcher-shops in warm weather is completely removed by washing with a solution of it. It prevents putrefaction but not the growth of mold. The circumstance that bacteria are killed by it while fungi remain unaffected promises to be of use in the cultivation of pure yeast, since the difficulties arising in fermentation industries generally are due to the development of bacteria.—Pharm. Centralh., xxx., 225.

Analysis of Formaldehyde.—The qualitative detection of formaldehyde is affected as follows: 1. One-half C.c. of dimethylaniline is poured into the solution in question, and the whole stirred briskly after being acidulated with a few drops of sulphuric acid. The combination between dimethylaniline and formaldehyde is easily effected by heating the mixture for half an hour on the water-bath. After having rendered it alkaline with soda, it is heated to ebullition until the odor of dimethylaniline has completely disappeared, when it is passed through a small paper filter. After washing, the filter is spread out at the bottom of a small porcelain capsule, moistened with acetic acid, and a small quantity of lead peroxide in fine powder thrown upon it. The blue coloration shows the presence of formaldehyde. 2. The author has found, also, that the formation of anhydroformaldehydeaniline, $C_6H_5N : CH_2$, is very easily effected by causing formaldehyde to act upon aniline; not in presence of acids, but simply in a dilute aqueous solution. This aqueous solution of aniline is obtained by dissolving 3 Gm. aniline in 1 litre of distilled water. Mix 20 C.c. of this solution in a test tube with 20 C.c. of the liquid in question, and neutralize. In presence of formaldehyde there appears, after some hours, a very slight white cloud. This reaction is said to be very sensitive, enabling formaldehyde to be detected in a solution of $\frac{1}{20000}$. In this case the turbidity appears only after some days. The reaction is common to acetic aldehyde. To detect formaldehyde in alimentary substances, the liquid products, after being decolorized and filtered, are submitted to one of the foregoing methods; while the solid products are first treated with hot water, in order to dissolve trioxymethylene, which may be derived from polymerization of formaldehyde. A microscopic examination of the substance may give useful indications. The detection of formaldehyde in alimentary substances is often impossible, because it forms with certain organic principles compounds from which it cannot be separated.

For the quantitative analysis of formaldehyde, Trillat recommends the following procedures: (1) He first determines exactly the acidity of a known quantity of the solution, by means of normal soda solution, using phenolphtalein as indicator. He measures 10 Cc. of the solution in question into a flask, dilutes with water, and adds a known quantity of a standard solution of ammonia until the odor is distinctly ammoniacal. The contents of the flask are then treated with a current of steam so as to expel the excess of ammonia, which is collected in water, and determined by means of a standard solution of sulphuric acid. The quantity of combined ammonia is found by deducting from the total quantity added that which is found in excess in the distillate, and taking account of the original acidity of the solution. The following equation enables us to calculate the proportion in which the combination takes place:

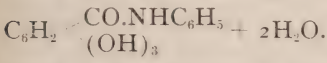
$$6CH_2O + 4NH_3 = (CH_2)_6N_4 + 6H_2O.$$

In this process a small portion of the hexamethyleneamine is carried away in distillation. (2) To a solution of 3 Gm. of aniline in 1 litre of water are added, drop by drop, with constant agitation, from 1 to 4 C.c. of the solution in question, according to its suspected strength. There is formed a white cloud, which after repeated agitation is entirely deposited. After forty-eight hours the liquid is passed through a tared filter, and it is ascertained that the filtrate contains an excess of aniline. It is dried at 40° C. and weighed. The corresponding quantity of formaldehyde is given by the equation:

$$C_6H_5NH_2 + CH_2O = C_6H_5N : CH_2 + H_2O.$$

By operating under these conditions, we obtain results strictly comparable; but the analysis of the anhydroformaldehydaniline does not give figures which exactly agree with the formula. Still, they approach it so closely, it is maintained, as to be in most cases approximately satisfactory. —See Trillat and Fayollat in Compt. rend., 1893.

Gallal, or aluminum gallate, forms a soluble double ammonium salt, which latter occurs in the form of shining scales.— Pharm. Ztg., 1893, p. 779. (See Salumine.)

Gallanol.—Merck describes under this name an anilid of gallic acid, having the form of colorless crystals, with a bitter taste, melting at 205°, and soluble in hot water, ether, alcohol, insoluble in benzol or chloroform,  $C_6H_2 <\begin{matrix} CO.NHC_6H_5 \\ (OH)_3 \end{matrix} + 2H_2O$. It has been used with advantage in some forms of skin disease in place of chrysophanic acid or pyrogallol.—Bericht, 1893, 54; Pharm. Jour. Trans., 1894, 730.

Gallobromol is the pharmaceutical name of dibromogallic acid corresponding to the formula $C_6Br_2(OH)_3CO.OH$. Since gallic acid has the formula $C_6H_2(OH)_3CO.OH$, it will be seen that dibromogallic acid is simply gallic acid in which 2 atoms of bromine have replaced the 2 atoms of hydrogen. In calculating the quantity of bromine contained in dibromogallic acid, it is found (Sem. Méd., 1893; No. 40) that it represents only half its weight, while potassium bromide contains about two-thirds its weight of bromine. This will explain, in part, why small doses of gallobromol exert so little influence physiologically. The presence, on the other hand, of 3 hydroxyl molecules necessitates a cautious use of strong doses. Gallobromol appears as white and delicate needles which are freely soluble in alcohol, ether and boiling water, and sufficiently so in cold water for administration—100 C. c. of water at 10° C, dissolving about 12 Gm. of the medicament—Lépine observed that, after administering gallobromol in doses of 50 centigrammes, in cachets, some patients complained of heaviness in the gastric region and of slight gastric pains. Excepting the slight disturbances, the patients seemed to tolerate the remedy well, even in doses of 10–15 Gm. Compared with potassium bromide, the action of gallobromol is not as depressing as that of the former medicament; but the author thinks that gallobromol is much less efficient than the latter in the treatment of epilepsy, while in diverse nervous troubles he found it very useful. After doses of 8–10 Gm. the urine assumes a roseate or slightly brownish color—Cazeneuve and Rolet were induced by the chemical composition of gallobromol to apply it in gonorrhœa (Lyon Méd., 1893; No. 29), and report their experience in 25 cases. The injection of a 10 per cent. solution of gallobromol causes a little pain, but far less than that of silver nitrate or potassium permanganate. Irrigation was done with ½ litre of a 1 per cent. or 2 per cent. solution daily by means of a Pezzer catheter, while some patients were simply treated with injections by means of an ordinary syringe 4–5 times a day. The 1 per cent. solution causes no pain, while the 2 per cent. solution provokes, with some patients, a slight burning sensation. On the other hand, these injections are said to calm urethral pain and to arrest or markedly weaken erections. Some patients were cured in 6–8 days. Chronic gonorrhœas are reported also to have yielded in a few days to gallobromol, especially to deep instillations into the posterior urethra. No by-effects were ever observed.—Merck's Mark. Rep., 1893, 175.

Galloparatoluide.—P. Cazeneuve, acting upon the suggestion that by the action of tannin upon aniline, gallanilid is prepared, has endeavored by dealing with the homologues of the base to obtain those of gallanilid by an analagous decomposition of the tannin of the nut-galls, but experiments proved that paratoluidine alone behaves in this respect in a similar manner to aniline. On heating paratoluidine with gallotannic acid and then treating with water acidulated with hydrochloric acid, a white crystalline product was obtained which melted at 211° C. (m. p. of gallanilid is 205°), was but slightly soluble in cold water, though very soluble in boiling water, and also soluble in alcohol and ether. The composition of the substance showed that it corresponds to gallotoluide and galloparatoluide.—Compt. rend., 1893, 633.

Glycerin-Phosphoric Acid.—Pasquali's observations that lecithin, the most important phosphoretted constituent of the food, is split up during the process of digestion into choline and glycero-phosphoric acid, has led Merck to prepare this acid and its calcium salt for medical use, as offering phosphorus in the form most suitable for assimilation. The acid is a slightly yellowish, oily liquid, inodorous and soluble in water and alcohol. Its composition is represented by the formula $(HO)_2 2PO.O.C_3H_5(OH)_2$. The calcium salt, $CaC_3H_7PO_6$, is a white, crystalline powder, readily soluble in cold water, but almost insoluble in boiling water, in consequence of which the water solution becomes turbid when heated.—Bericht, 1893, 10: Pharm. Jour. Trans., 1894, 730.

Glycero-Phosphates.—At the Academy of Medicine recently Albert Robin read a communication concerning the first results obtained by him by means of a new medication which he finds to exercise a specific action on nervous nutrition. The treatment is by glycero-phosphates. By these he hopes to obtain effects at least equal to those produced by the famous Brown-Sequard elixir. Assuming that the qualities of "sequardine" are probably only due to the phosphorus it contains, Dr. Robin has experimented with a preparation of glycerin and phosphorus, obtaining excellent results in influenza convalescence, etc. He speaks of his new medicament as exercising the contrary effect to antipyrine, the latter being given in cases of intense nervous excitability, whereas glycero-phosphates are intended as a treatment for nervous depression. The new preparation appears to resemble Dr. Ashburton-Thompson's solution. L. Portes and G. Prunier describe a process for preparing the calcium salt. Phosphoglyceric acid is first prepared by maintaining a mixture of liquid phosphoric acid and glycerin at at emperature of 100° to 110° C. for six days. After cooling, calcium carbonate is added until the acid is neutralized. The precipitate formed is dissolved in cold water, and the solution filtered and evaporated at a low temperature. The product is a white, slightly crystalline powder, which is soluble in 15 parts of cold water, almost insoluble in boiling water, insoluble in alcohol, and gives but a faint reaction with ammonium molybdate.—Journ. Pharm. Chim., xxix, 393.

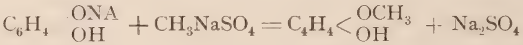
Glycero-Phosphates.—Editorial on A. Robin's new nervine medicine.—Chem. aud Drug., 1894, 691.

Phospho-Glycerate of Lime.—See Calcium Glycerinophosphate.

Glycozone—The Therapeutics, Composition and Characteristics.—C. Edson.—West. Drug., 183, 435.

Guaiacol.—It has been studied in its effects by L. Guinard, who concludes that the lowering of the temperature which has been noticed upon using guaiacol for this purpose is not due to the absorption of the medicament by the skin; the rapidity of the action being sufficient proof, although it is possible after a time through its local action upon the epidermis. The presence of guaiacol in the urine of patients, upon whom it has been used as a protective, is due to its vapors penetrating the respiratory passages, although this quantity is not sufficient for producing the lowering of temperature. In noting the local and general effects of guaiacol it is necessary to take into consideration: 1, the quality of the product; 2, the susceptibility of the individual; and, 3, his state of health; there is little effect upon the temperature of apyretic subjects. The local effect of guaiacol is more pronounced if the part protected is excluded from the air by an impermeable covering.—Bull. Gén. de Therap., October, 1893, 339; Amer. Jour. Pharm., 1894, 41.

Preparation of Guaiacol.—The guaiacol obtained by practical distillation of the crude product from wood tar is always more or less contaminated with cresols or creosols, etc. Chemically pure guaiacol is obtained synthetically by heating under pressure a mixture of pyrocatechin, potassium salt of methyl, sulphuric acid and sodium hydrate in molecular proportions:



$$C_6H_4 \begin{matrix}ONA\\OH\end{matrix} + CH_3NaSO_4 = C_4H_4<\begin{matrix}OCH_3\\OH\end{matrix} + Na_2SO_4$$

Thus prepared it forms in crystalline prisms of melting point 28.5° C. and boiling point 20.5° C.

The preparation of pyrocatechin ($C_6H_4(OH_2)$ (1 : 2)) was formerly very expensive; but is now with little difficulty made from benzene or toluene derivatives. By action of carbonic acid on sodium phenol under pressure and high temperature, paraoxybenzoic acid is formed. This on bromating is converted into bromo-p-oxybenzoic acid, the bromine taking the ortho position in the hydroxyl group. This on fusing with sodium hydrate forms pyrocatechin soda; from this, on treatment with an acid pyrocatechin results.—Pharm. Centralh., 1894, 97.

Synthetic Guaiacol has been recently prepared by Béhal and Choay. The crystals of pure guaiacol are white and hard; they melt at 28.5° C. (83.3° F.), and boil at 205° C. (401° F). When melted, the guaiacol remains in fusion for an indefinite time. It is soluble in most of the organic solvents even in benzin; it is also soluble in petroleum ether, and crystallizes very well on the evaporation of this solvent. Anhydrous glycerin dissolves crystalline guaiacol in large proportions.

Experiments were first made on animals, and then the remedy was used in phthisical patients in various stages of the disease. The daily doses were from 40 Cgm. to 1.2 Gm., and were given in the form of pearls each containing 0.2 Gm. of the medicament in oily solution, directly before meals.

The stomach is said to tolerate synthetic guaiacol well, as a rule. Large doses sometimes provoke vomiting.—Amer. Drug. and Pharm. Rec., 1894, 76.

Crystallized Guaiacol.—Chemically pure guaiacol is a crystalline substance. The so-called "absolutely pure" guaiacol of commerce contains at the highest only 90 per cent. of guaiacol, mixed with creosol or other phenols. On subjecting this to a low temperature a crystalline mass results, from which the mother liquor is separated by means of a centrifugal machine. The resulting guaiacol melts at 32°C. and again hardens at 27°C. It boils between 204 and 205°C.

Tests of purity: On mixing 2 C.c. of liquefied chemically pure guaiacol with 4 Cc. of concentrated sulphuric acid a colorless solution should result. If to 2 C.c. of guaiacol 2 C.c. of sodium hydroxide solution (spec. gr. 1.3) is added, a clear solution results, which rapidly hardens, forming a crystalline mass. On mixing 2 C.c. of guaiacol with 4 C.c. of glycerin (spec. gr. 1.19) no change in volume shall take place.

2 C.c. of guaiacol requires 16 C.c. of petroleum benzin for solution, while 2 C.c. of the so-called "absolutely pure" guaiacol requires only 8 C.c. for this purpose.—Apoth. Zeit., 1894, 7.

Guaiacol.—A. Eichler contributes an article to the preparation of guaiacol used in medicine.—Drug. Circ., 1894, 123.

Guaiacol Iodoform is prepared by digesting 4 parts of guaiacol, 1 part of iodoform and 1 part of expressed oil of almonds on a water bath. The oil is necessary to keep the iodoform in solution. It is recommended in tuberculosis of the joints. From 0.5 to 1 gm. is given at one injection.—Pharm. Centralh., 1894, 37.

Headine, a secret preparation, was found to consist of 68.73 per cent. acetanilid and 31.57 per cent. sodium bicarbonate.—A. Schneider, Pharm. Centralh, 1893, 364.

Hæmalbumin, a New Dietetic Preparation.—Hæmalbumin is the name given by M. Dahmen (Deutsche Med. Woch., 1894, 330) to a preparation said to contain all the salts and albuminoids existing in the blood—such as hæmoglobulin and hæmatin, serum-albumin and paraglobulin (except fibrin). It is described as a stable powder, readily soluble in hot water and in alcoholic fluids. Relatively few therapeutic experiments have as yet been made with this new dietetic preparation, but a strikingly favorable result is reported to have been obtained in chlorosis and general debility from doses of 1 Gm. given three to five times daily. Hæmalbumin is said to contain the albuminous substances in the form of acid, non-coagulable albuminates, absorbable even in cases where the stomach secretes no juice capable of digesting. Calcium and magnesium di- and tri-phosphates are said to be converted by hæmalbumin into soluble albuminoids.

Hydrargyrum Thymolo-Aceticum, when first offered, had assigned to it no definite formula, but is now claimed to be formed from two molecules of mercuric acetate, in which one acetyl group is replaced by the radical thymol, so that it has the following formula $Hg(C_2H_3O_2)_2 + Hg(C_2H_3O_2)(C_{10}H_{14}O)$.—Amer. Drug. and Pharm. Rec., 1893, 79.

Hypnal Preparations.—Hypnal (monochloral-antipyrine) seems to be rapidly coming to the front as a hypnotic, pure and simple. Filhene gives, in the Berliner Klinische Wochenschrift, the following formula for its administration :

Hypnal	10 Gm.
Distilled water	100 Gm.

Mix and dissolve. The dose is 1 tablespoonful at bed-time. In case sleep is not produced in a half hour, give a dessertspoonful. Instead of 100 Gm. of water, 80 Gm. of the latter and 20 Gm. of any desirable syrup may be used. Hypnal may be given in substance if desirable. The dose is 1 to 2 Gm., which should be administered in capsules or cachets.—Nat. Drug., 1894, 26.

Iatrol is a name applied to iodomethylanilid. It occurs in the form of an odorless powder, and is said to have no bad effect on the animal organism. It is recommended as a desiccating antiseptic to take the place of iodoform.—Pharm. Zeit., 1893, 655.

Iodocasein is a yellowish powder with a faint odor of iodine, which is recommended by Rohrmann as an antiseptic dressing either alone or precipitated on gauze.—Amer. Drug. and Pharm. Rec., 1894, 276.

Iodocaffeine, Iodotheine and Iodotheobromine are described by Kummo (Rép. de Pharm., 1893, 495) as compounds of caffeine, theine, and theobromine, with sodium iodide. To obtain iodocaffeine (sodium and caffeine iodide) a mixture of 35 parts of sodium iodide and 65 parts of caffeine is dissolved (cold) in a sufficient quantity of water, and evaporated to dryness. Colorless crystals are thus obtained, which are soluble in 7 parts of water at 35° C. Iodotheine is prepared in the same way, and occurs as a white powder, 18 parts of which dissolve in 100 parts of water at 35° C. Iodotheobromine is not so easily obtained, on account of the insolubility of theobromine in water. It is prepared by adding a concentrated solution of sodium salicylate to the mixture of sodium iodide and theobromine. These three compounds are, like all the caffeine and theobromine salts, rather unstable, and decompose in hot water. They all, it is stated, exercise a peculiar action on the heart. Iodotheobromine increases systolic energy, arterial pressure, and diuresis, to a greater extent than iodocaffeine ; neither exerts marked influence on respiration or temperature ; they are well tolerated by the stomach, and rapidly eliminated by the urine, if the kidneys are in good condition. The dose for adults is 0.5 to 3 Gm. daily, administered in cachets.

Iodoform-salol is a solution of iodoform in melted salol, which crystallizes on cooling. It has been used by Reynier and Wall (Therap. Blätter, 1893, 233) as a disinfectant for injection into fistulous processes and suppurating cavities.

Iodocresol—Some iodine compounds of a new class, characterized by their capability of crystallizing, and freedom from color or smell, have been obtained by the firm of Bayer and Co., by operating upon phenols in dilute solutions with limited proportions of caustic soda or alkaline carbonate. A solution of ortho-oxy-para-toluylic acid (m-cresotinic acid) in $1\frac{1}{2}$ mol. of alkaline carbonate or 3 mol. of caustic alkali yields, when acted upon with iodine, triiodo cresol, $C_6HI_3.CH_3.OH$, which is a substance sparingly soluble in alcohol or petroleum spirit, readily soluble in ether, benzene, chloroform or fat oils.—Pharm. Jour. Trans., 1894, 730.

Iodine Eugenol.—Obtained by treating an alkaline solution of eugenol with iodine.

Iodol Caffeine.—A crystalline compound formed by the action of iodol on caffeine. Inodorous and tasteless; recommended because of its greater stability than iodol.—Alumni Jour., 1894, 16.

A Definite Compound of Iron and Albumen.—A. Jaquet (Corresp. Bl. f. Schweiz. Aerzte), communicates the following method (invented by Marfori) for preparing a compound of iron and albumen yielding no iron precipitate with the common reagents and containing more iron than hæmatogen and hæmoglobin. Shake fresh albumen with an equal volume of water and add potassa-solution freely; the albumen will, in a few minutes, change into a gelatinous, yellowish mass, which is washed with a little water to remove the excess of potash-solution, and then heated on the water-bath for 4–5 hours, when the gelatinous mass will become perfectly clear. Filter, dilute with water, and add acetic acid. A flocculent precipitate will be formed, which will soon sink to the bottom. This precipitate is carefully washed, dissolved in ammonia, and mixed with a carefully neutralized solution of iron tartrate in a manner that there will be 1 Gm. of the iron salt to the albumen of 25 eggs. The red solution is kept boiling in a retort for half an hour, and then filtered. When cool, the new compound is precipitated with dilute acetic acid. Repeated solution in ammonia and precipitation with diluted hydrochloric acid, will free the substance from the last traces of iron oxide. It is then dried over sulphuric acid. It now forms a limpid, yellowish powder, which readily and completely dissolves in diluted solutions of ammonia, sodium and potassium carbonates, without change. When a drop of ammonium sulphide is added to an ammoniacal solution of the preparation, no immediate change of the color of the solution is noticed, the coloration remaining the same during a period of time dependent on the concentration and quantity of the added ammonium sulphide. Gradually there appears a green coloration, turning into dark green and finally into black. Heat accelerates reaction. By adding a drop of potassium ferrocyanide to an ammoniacal solution of the preparation and acidulating with hydrochloric acid, a white precipitate will be produced which gradually assumes a blue color. Acids, especially mineral, are very apt to alter the compound ; but no iron can be extracted from it with hydrochloric acid, and this reaction distinguishes it sharply from the ordinary iron albuminates. Various analyses showed that this substance uniformly contains 0.69 to 0.71 per cent. of iron, considerably more, therefore, than hæmatin and hæmoglobin do.—Correspond. Blatt. für Schweiz. Aertze, 1893, 13 ; (See, also, L'Union Pharm., 1893, No. 10).

Iron Albuminate of Definite Composition.—The following process of preparing iron albuminate has been patented in Germany (Union Pharm., 1893, No. 10). 100 parts of white of egg are dissolved in 2,000 parts of cold distilled water. To this liquid are added successively :

(*a*)	Iron tartrate	25 parts.
	Distilled water	250 "
	Solution of soda, 10 per cent	q. s. to neutralize.
(*b*)	Neutral sodium tartrate	10 parts.
	Water	90 "
(*c*)	Solution of soda, 10 per cent	38 "

The resulting turbid, yellowish-brown solution is heated to 90° C., or it is set aside at the ordinary temperature until it has become limpid and paler. On the sand-bath this result is obtained in 2–4 hours. To eliminate the excess of alkali, a solution of tartaric acid is added, after cooling, until an acid reaction is shown ; the solution is then treated with ammonia until its reaction has become distinctly alkaline, and is now left for 24 hours at 90° C., or for several days at the ordinary temperature. On adding to the cool liquid a tartaric acid solution until an acid reaction again sets in, a modification of iron albuminate is precipitated which is said to be entirely free from foreign salts. It is thrown on a filter, washed with water, and expressed. To purify it, it is again dissolved in 1,400 parts of distilled water admixed with 20 parts of 25 per cent. ammonia and 20 parts of a 10-per cent. solution of neutral ammonium tartrate, and heated at 90° C. for 48 hours. The albuminate is then precipitated by tartaric acid, washed with water until all acid reaction has disappeared, collected on the filter, expressed and dried.

Iron Saccharates.— F. Evers (Ber. d. Chem. Ges. ; 1894, 474) reports the following procedure for preparing iron-saccharates containing a minimum of sugar : A solution of 3 parts of cane-sugar in 25 of ferric-chloride solution (sp. gr. of 1.280) and 80 of distilled water, is poured, while being rapidly stirred, into a cooled 7.5 per cent. soda-solution, in slight excess; the mixture is freely diluted, before the precipitate formed again dissolves with distilled water, and the precipitate is immediately collected and washed with water, previously admixed with 0.1 per cent. of cane-sugar, until it is absolutely free from alkali. The analysis of a saccharate prepared in this manner and dried at a gentle heat gave 48.99 and 47.93 per cent. of iron, respectively. This iron-saccharate dissolves in sugar-solution up to about 95 per cent. iron hydroxide free from sugar remaining as a residue. Solubility decreases if the preparation is dried in the air, in which case sugar separates. The iron saccharate, free from alkali, is distinguished from that containing alkali, by its producing with sodium acetate no precipitate of iron hydroxide. An iron maltosate, containing a minimum of maltose and insoluble in water, is obtained in the same manner as the saccharate just described. It contains no iron hydroxide free from maltose. It dissolves completely and clearly in maltose at 90° C.; at higher temperature, the solution is decomposed, for which reason evaporation is best done in vacuo at as low a temperature as possible. The above-described procedure is considered valuable for the preparation of iron maltosate, because alkalies alter maltose in the presence of heat. On dissolving 2.285 parts of iron maltosate in an aqueous solution of 3.494 parts of crystallized maltose and evaporating in vacuo, a brown, amorphous and very hygroscopic mass was obtained, which solidified on cooling and contained 31.88 per cent. of iron. The composition of this preparation is approximately represented by the formula $(Fe_2O_3)_2.C_{12}H_{22}O_{11}+2H_2O$, from which 32.09 per cent. may be calculated to be iron.

Izal is a new proprietary English disinfectant, probably of the same class as sapocarbol, cresol, lysol, etc. According to the Chemist and Druggist, however, it contains no phenol.—See Lancet, 1893, 36.

Kelene is a new name for ethyl chloride, which renders efficacious service in minor surgery.—Jour. de Pharm. d'Anvers, 1893, 260; Amer. Jour. Pharm., 1893, 500.

Kresin is the trade name given to a very recent antiseptic and disinfectant brought out by German chemists. It is described as being a simple mixture of 25 per cent. of cresol and 25 per cent. of cres-oxyl acetate in water, of a brown color and retaining the odor of the cresol in it. It is readily diluted with water in all proportions, making a clear solution. Some of its claims to attention are that it is relatively less poisonous, causes less irritation, and is efficient in smaller quantities than carbolic acid.—Squibb's Ephem., 1894, 1507.

Kryostaz is announced for early introduction. It is described as a mixture of equal parts of carbolic acid, camphor, zapon lac, and a smaller proportion of oil of turpentine. The product is a gelatinous mass, transparent, pale-yellow color. The peculiarity of this product is that it becomes solid at ordinary room temperature, and liquefies in the cold; its application will be technical, and some interesting developments will no doubt soon follow the preliminary announcement.—Pharm. Centralh., 1894, 154.

Lactophenin has recently been brought out as a possible superior substitute for phenacetin, from which latter it differs in the substitution of lactic for acetic acid. It is far more soluble than phenacetin, 1 part dissolving in 45 parts of water.—Pharm. Centralh., 1894, 181, 207 and 357.

Lactophenin.—Landowsky (Sem. Med., February 7th) has tried the effect in several cases of lactophenin. This drug has antineuralgic properties analogous to antipyrine, and has, besides, a genuine hypnotic effect. The amount given daily was from 60 Cgm. to 3 Gm., divided into several doses. The only disagreeable by-effects caused by the drug seemed to be diaphoresis and slight giddiness in a few of the patients.—Medical Record, 1894.

Lactol (Lacto-naphtol) is a substance prepared by Coez, analagous to benzo-naphtol. It is the lactic ether of beta-naphtol. It decomposes in the digestive organs into lactic acid and naphtol, and seems to have therapeutic properties; but data in this regard are wanting. Lactol is insipid. Coez is reported to have ingested a Gm. of it for several successive days without the slightest inconvenience.—Rép. de Pharm., 1894, 166.

Lanaine, which is extracted from wool, is a clear, yellow heterogeneous fat, fusible near 36° C., neutral and permanent in air; it is easily soluble in ether, benzene, chloroform and acetone; but difficultly soluble in cold alcohol; it is composed principally of fatty acids, cholesterin and isocholesterin, which are saponified with potassium and sodium in alcoholic solution, but not in aqueous solution.—Rép. de Pharm., 1893, 467.

Lipanin is an artificial mixture of 1 part lipanic acid and about 16 parts olive oil, designed by P. J. von Mering as a substitute for cod-liver oil. It contains a large percentage of free oleic acid, making it easily digestible; it emulsifies readily and is quickly absorbed; it is highly palatable, and acceptable to the weakest stomach. Dose, 1 drachm to commence with, gradually increased to 2 and 4 drachms, according to age.—Am. Therap., 1893, 328.

Llareta, a New Antigonorrhœic.—Llareta is the abbreviated name for Haplopapus llareta, a plant growing abundantly in Chili, and with which D. Infante (Aertzl. Rundschau, 1893, No. 32) claims to have obtained a radical cure within ten to fifteen days in every case of gonorrhœa in which it was tried.

Loretin or m-iodo-o-oxyquinoline-ana-sulphonic acid, a substitute for iodoform and carbolic acid, forms a yellow crystalline powder which is difficultly soluble in water and alcohol and insoluble in ethereal oils; suspended in collodion and oils it is useful for certain purposes; mixed with a few per cent. of magnesia it can be used as a dusting powder. With the alkalies it forms orange red salts soluble in water, a 2–5 per cent. solution of the sodium salt can replace carbolic acid water as a wash. The calcium salt is insoluble and can be precipitated upon gauze by first impregnating the gauze with the sodium salt and then immersing in solution of calcium chloride.—Pharm. Ztg., 1893, 746. See also Claus, in Arch. Pharm., 1893, 704.

Losophan (Tri-iodo-meta-cresol) is a new antiseptic produced by the action of iodine upon *m*-oxytoluic acid according to a complex reaction. It is described as occurring in colorless needle-like crystals, containing about 80 per cent. of iodine. When dissolved in as weak an alcohol as 50 per cent. it readily decomposes, but in a 75 per cent. alcohol it remains practically permanent.—Squibb's Ephem., 1894, 1507.

Lycetol is the name applied to the tartrate of dipropylene-diamine (dimethylpiperazine), a derivative of piperazine, which may be regarded as consisting of two propylene-residues united by two amide molecules. Dipropylenediamine is a base melting between 117 and 120° C. while its hydrochlorate melts at 228° C. According to Dr. Wittzack, it is at least equal to piperazine as a solvent of uric acid. The tartrate —lycetol proper—is considered the best salt for therapeutic use; besides having the property of dissolving uric acid, it is said to be a reliable diuretic, the tartrate being oxidized into carbonate in the organism, and thus alkalinizing the blood. The author lauds the excellent taste and the non-hygroscopicity of lycetol. He observed, after its use, a considerable increase of diuresis, with decreased specific gravity of the urine. The salt was always borne well on continued application, without any disturbance of the general condition, and is said to have caused the cessation of gouty manifestations of all kinds. The subcutaneous injection of lycetol is not recommended.—Apoth. Zeit., 1894, 76.

Lysol.—King of Antiseptics.—H. de Parville. Translated from Les Annales, for Buffalo Med. and Surg. Jour., Aug., 1893. Reprinted in Notes on New Rem., 1893, 38.

Lysol as a disinfectant.—C. B. Adams in Notes on New Rem., 1893, 40. Summary of investigations which convince the author of its antiseptic value.

Malakin, or salicyl-phenetidine, closely related to phenacetin (acetphenetidine) is recommended as an antipyretic, antirheumatic and antineuralgic; the single dose is 1 gram, the daily dose 4–6 Gm. Insoluble in water, cold alcohol and alkaline carbonates, it is quite soluble in solution of soda and in boiling alcohol. Despite the insolubility it is readily absorbed, being decomposed in the stomach into phenetidine and salicyl aldehyde; the latter is oxidized and voided as salicylic acid and can be detected in the urine twenty minutes after the introduction of the remedy. —A. Jaquet (Korr.-Bl. f. Schwz. Aerzte), Pharm. Ztg., 1893, 615. See also, Pharm. Jour. Trans., 1893, 507, and Nouv. Rem., 1893, 465.

Mercury Asparagate (or aspartate amidosuccinate), placed on the market in the form of a 1 per cent. solution, is recommended by Neumann (Wien. Med. Bl.) as an antisyphilitic equal to Bamberger's peptonized mercury, or Liebreich's form-amidated mercury. It is given subcutaneously, 0.5 C.c. of the solution once a day.—West. Drug., 1893, 601.

Mercury Gallate.—The instability of mercury tannate, which makes the latter unfit for therapeutic use, led Barousse and Gay to study the gallic acid compounds of mercury (Compt. rend., 1893, p. 284). No stable gallate is formed by precipitating a solution of a mercurous nitrate or mercuric acetate with gallic acid. A permanent compound can, however, be obtained by triturating 37.6 Gm. of cryst. gallic acid with 21.6 Gm. of yellow mercuric oxide and then adding 25 C.c. of water. The resulting mass is set aside for two days, powdered, and dried over sulphuric acid. This preparation has a pale greenish-black color, and consists principally of mercurous (?) gallate, containing 37.17 per cent. of metallic mercury.

It is recommended for the treatment of syphilis, and is said not to cause the by-effects of mercuric chloride and iodide.—Pharm. Zeit., 1893, 568. (See, also, Bull. Méd., 1893, No. 64.)

Mercury and Potassium Hyposulphite, $3Hg(S_2O_3)_2+5K_2S_2O_3$, occurs as coloress crystals, containing 31.4 per cent. of metallic mercury, freely soluble in water, and causing no precipitation in albuminous liquids. According to D. Dreser, the subcutaneous injections of this new double-salt are not more painful than the ordinary morphine injections, while being free from irritant effects. 2.32 Gm. of mercury and potassium hyposulphite correspond in mercurial value to 1 Gm. mercuric chloride. The following formula is given:

Mercury and potassium hyposulphite	1 part.
Distilled water	40 parts.

½–1 C.c. [8–16 min.] per injection, as an antisyphilitic.

—Merck's Bericht., 1893, 59.

Methylene Blue.—C. Ferreira (Bull. gén. de Thérap., 1893, 488) cites a large number of cases of malarial fevers, which were treated successfully by methylene blue, and states that it is tolerated without the slightest inconvenience even by young children, to whom it is administered in doses varying according to age, and that it has a manifest action on the malarial germs, causing the disappearance of the characteristic stigmata and especially of the enlargement of the liver and the spleen.

Dabrowski (Gaz. lek., 1893, through Nouv. rem., June, 1893, p. 274) also testifies to the anti-malarial action of the methylene blue, and that it has been well tolerated in all cases but one, which have come to his notice. He considers that the favorable action is due not to its direct influence on the germs, but to its so modifying the constitution of the blood as to render the multiplication of the micro-organisms impossible.—Amer. Jour. Pharm., 1893, 499; See, also, Squibb's Ephem., 1894, 1509.

Migränin.—According to J. Hoffmann, (Phar. Weekblad) this consists of antipyrine 89.4 per cent., caffeine 8.2 per cent., citric acid 0.2 per cent., and moisture 1.84 per cent.—Alumni Jour., 1894, 89.

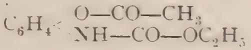
Moyrapuama—A New Nerve-Tonic and Aphrodisiac.—Rebourgeon in Nouv. Rem. The botanical origin is unknown. It contains a glucoside isolated by Dragendorff and the use of Moyrapuama appears to be indicated in the treatment of general neurasthenia, and particularly in digestive asthenia, circulatory asthenia and asthenia of the generative organs of the male and female.—Nat. Drug., 1894, 83.

Differentiation of α- and β-naphtol.—M. Aymonier uses the following reagent for distinguishing between α- and β-naphtol: Potassium dichromate, 1 Gm.; distilled water, 10 C.c.; pure nitric acid, 1 Gm. A few drops of this reagent produce with α-naphtol an immediate black precipitate which darkens upon further addition of the reagent, while β-naphtol is not affected by the test. Salol, benzo-naphtol, thymol and other phenols are likewise insensible to this reagent.—L'Union Pharm., 1893, 334: Amer. Jour. Pharm., 1893, 450. See, also, Boll. Chim. Farm., 1893, 349.

Antifermentative Action of Benzonaphtol.—The results by Ewald, typical of a large number of experiments, conclusively prove that benzonaphtol possesses a distinctly antifermentative action on the contents of the intestines. Of course, benzonaphtol being insoluble in water, this action is first developed when the α-naphthol is liberated in the intestines by the action of the alkaline juices, and is really due to the antiseptic qualities of α-naphthol, which are well known; but as pointed out benzonaphtol is tasteless, and the disagreeable irritating taste of α- or β-naphthol is avoided by its use.—Notes on New Rem., 1893, 55.

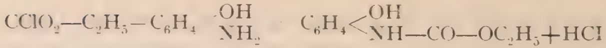
Nasrol, the caffeinsulphonate of sodium, is recommended as an energetic diuretic: it has a bitter taste, is very soluble in boiling water, but only slightly soluble in cold water.—Apoth. Zeit., 1893, 575.

Neurodin.—An acetyl-p-oxy-phenyl-urethane.—E. Merck.



$$C_6H_4<\begin{matrix}O—CO—CH_3\\NH—CO—OC_2H_5\end{matrix}$$

Is prepared by the action of chloro-ethylformic ester upon p-amidophenol.



$$CClO_2—C_2H_5—C_6H_4\begin{smallmatrix}OH\\NH_2\end{smallmatrix} \quad C_6H_4<\begin{smallmatrix}OH\\NH—CO—OC_2H_5\end{smallmatrix}+HCl$$

The p-oxyphenylurethane formed is acetylated by heating with acetic anhydride. Forms colorless, odorless crystals, soluble 1 in 1400 of cold water. Melting point 87° C. As antiseptic, in doses of 0.5 grains, it lowers the temperature 2.5° to 3°. As anodyne in neuralgia, is given in doses of 1 to 1.5 Gm.—Alumni Jour., 1894, 89. See Pharm. Zeit., 1893, 785.

Nutrin is the name given to a dietetic food, representing, according to the manufacturers, "the pure nutritious substance of meat." It is a fine, brownish-yellow, permanent powder, of a somewhat salty and pleasant meat taste, and of such concentration that 1 part corresponds to all the nutritious matter contained in more than 4 parts of muscle-beef. The published analysis of this powder gives: 83.5 per cent. of albumen; 61 per cent. of fat; 4.9 per cent. of nutritive salts of meat; and 5.5 per cent. of water.—Pharm. Centralh., 1894, 185.

Odontodol is the name given to a dental anodyne said to have the following composition:

Cocaine hydrochlorate	1 part.
Cherry-laurel oil	1 "
Tincture of arnica	10 parts.
Solution of ammonium acetate	20 "

If the pain be due to caries, a little pledget of lint impregnated with this liquid is inserted into the hollow tooth; if it be from inflammation of the pulp, the mouth should be rinsed with 30 drops of odontodol in 50 Gm. of lukewarm decoction of linseed; and if it extends all along the maxilla, rinse the mouth as before and then rub the whole affected part with a few drops of odontodol. The patient should be warned not to swallow any of the anodyne.—L'Union Pharm., 1894, 166.

Oleo-creosote.—The ester of oleic acid and creosote is a yellow, oily liquid, having a faint odor of creosote but free from the caustic taste of creosote; it is insoluble in water, alcohol and glycerin, but easily soluble in absolute alcohol and ether. Being a neutral body, daily doses of 10-15 Gm. can be administered without interfering with the functions of the stomach. It can be made by allowing 74.4 Gm. pure creosote and 109.2 Gm. pure oleic acid to stand for several hours before heating in an oil-bath to 135° C. for 1½ hours; the product is then repeatedly washed with distilled water, next with a dilute soda solution, and lastly again with distilled water; to remove the last traces of water it is agitated with anhydrous sodium sulphate. The yield is rather unsatisfactory, as only about fifty per cent. of the theoretical quantity is obtained.—C. Levy, Jour. der Pharm. v. Els.-Lothr., 1893, 249: Amer. Jour. Pharm., 1893, 492. (See Pharm. Zeit., 1893, 511).

Oil of Hydnocarpus Inebrians is a new remedy used with success in leprosy. It was administered (Sem. Méd., 1893, No. 46) in the morning, in boiled milk, in doses varying from 60 centigrammes to 15 Gm. An inunction of the entire body with the pure oil was prescribed at the same time, and two hours afterward the patient took a warm bath. Sometimes another inunction was practiced in the course of the day or at bedtime. The use of pork, beef, fish, alcoholic beverages, tea, and coffee, was forbidden; while milk, fruit, vegetables, eggs, butter, mutton, and fowl were allowed.

Orchidin.—A. Poehl (Pharm. Centralh., 1894, 288) calls this his testicular fluid, which is prepared as follows: The testicles are exhausted in the percolator with water acidulated with hydrochloric acid; the albuminous substances are removed by the combined method of Schmidt-Mühlheim and A. Gauthier, and the leucomaines precipitated as phospho-tungstates. After the decomposition of the latter by baryta, the leucomaines are transformed into double-salts with sodium chloride, dissolved in water, and sterilized. The preparation is rather unstable and is best kept in a 3 per cent. aqueous solution in glass vials closed by fusion; but it is credited with the advantage over "Brownséquardin," of being free from albuminoids while retaining all the leucomaines. It is employed subcutaneously, and has thus far proven harmless.

Orexin (Phenyl-dihydro-quin-azoline) has not advanced much in the estimation of observers during the past year, and it still remains difficult to determine accurately the extent to which the appetite is promoted by any single agent when so much has to be taken into account. The hydrochlorate of orexin has heretofore been the form most used, but now Paal has found that the base orexin itself is preferable in the way of being less disagreeable in taste, to say the least, and R. Frommel and Pentzoldt both find that it acts fully as well. Frommel relates his experience in cases of loss of appetite after serious operations. He used it in four cases of young pregnant women suffering with uncontrollable vomiting. All were relieved within two weeks.—Squibb's Ephem., 1894, 1514.

Orexin Hydrochlorate.—According to Pentzoldt (Pharm. Centralh., 1893, 113), this is a valuable stomachic, the action of which is also due to the splitting off of hydrochloric acid in the stomach. There are a few very objectionable after-effects, namely, vomiting and very intense burning of the mucous membranes. Pentzoldt, upon investigation, found the basic salt (Orexinum basicum) a very desirable substitute for the former, as he noticed no burning sensation, and with a little caution prevented vomiting. The properties of the latter are equally as good as those of the former, which give it the name as an invaluable appetizer. Orexinum basicum is prescribed in powder form, and is best given in cachets or wafers. The average dose is 0.3 Gm. daily, which can be increased to 0.5 Gm. This remedy is best administered about ten o'clock in the forenoon.

Ozalin is a fancy name for a new disinfectant. Apparently it is nothing more than calcium, magnesium and iron sulphates, with burnt lime and magnesia.—Brit. and Col. Drug., 1893.

Païco.—Under this name the flowering branches of Ambrina ambrosioides and A. chilensis are introduced for catarrh of the stomach. The medicinal properties are due to an ethereal oil, which is yellow and of a characteristic odor. The powder is given doses of 0.2 Gm., the fld. ext. 20 to 30 drops.—Pharm. Post, 1893, 387.

Païcoline.—An elixir of païco. 400 Gm. of drug are exhausted with 600 Gm. of alcohol. To this 400 Gm. of syrup are added. Dose, 1 tablespoonful before each meal.—Ibid., 387.

Parabromthymol is prepared by G. Plancher (Gaz. Chim., 1893, No. 23), as follows: 25 parts of well dried thymol are dissolved in 50 parts of glacial acetic acid, cooled by being placed in cold water, and then admixed drop by drop with a mixture of 26 parts each of bromine and glacial acetic acid. Then are added 21 parts of water, and a small crystal of bromthymol, when the parabromthymol will separate out in crystals. This is dissolved in soda solution; the liquid filtered, and the parabromthymol again separated by means of dilute sulphuric acid. From the above-stated quantities 29 parts of bromthymol are obtained. Parabromthymol melts at 52–53° C. The author prefers a concentrated solution of ammonium carbonate to the soda solution, because there is less loss. The parabromthymol thus prepared crystallizes from benzene (boiling point, 70–90° C.) in large rhombic plates melting between 55–56° C.

Parachloralose, $C_8H_{11}Cl_3O_6$, is a by-product obtained in the preparation of chloralose. It occurs as white, shining leaflets, soluble in alcohol, difficultly so in hot water, and melting between 227 and 229° C. Hanriot and Richet, as well as Heffter, have declared parachloralose to be free from any therapeutic action; whilst Moss reports that he has found it active. Further reports are awaited.—Merck's Mark. Rep., 1894, 75.

Paraform.—M. Aronsohn thus designates polymerized formic aldehyde, a substance recommended for use in the intestinal tube as an antiseptic. It is a white crystalline substance, insoluble in water, and Aronsohn claims that of the antiseptics compared wifh it—β-naphtol, iodoform, dermatol, salol, and benzo-naphtol—the first-named is the only other substance that at all completely checks the development of bacteria. Paraform, however, is superior to β-naphtol, a $\frac{1}{50000}$ solution acting upon typhoid bacilli as effectually as a $\frac{1}{3000}$ solution of the latter. Again, 0.05 Gm. of paraform sterilized 200 Gm. of urine, while 0.15 Gm. of β-naphtol was required for the same purpose. A dose of 5 Gm. of paraform did not produce any ill effects when taken, and its physiological action resembles that of calomel. —L'Union Pharm., xxxv, 165; Pharm. Jour. Trans., 1894, 895.

Paramannan is a new carbo-hydrate isolated by Gilsen from Coffea arabica. It occurs in white, light micro-crystalline powder, insoluble in water and alcohol, and easily soluble in concentrated sulphuric acid. On boiling with acids it is converted into mannose.—Amer. Drug. and Pharm. Rec., 1894, 246.

Pelagin.—A mixture of antipyrine, cocaine and caffeine in the form of a solution, and used for sea-sickness, whence it derives its name.—Pharm. Zeit., 1893, 536.

Pental in Surgery.—P. F. Feodoroff (Nouveaux Remèdes from Vratch, Nov. 3, 1893). Pental is a chemical body which, unlike ethyl bromide, is stable and does not decompose when exposed to air; it burns with a bright flame but does not explode. Its vapor is not irritating and for short operations the author considers its use is convenient. Anæsthesia is obtained in one or two minutes with a quantity of liquid varying from two to eight grammes, and lasts from two to four minutes. Excitement is transitory or absent, recovery is agreeable and without the sensation of nausea, headache, etc. It should be administered in the recumbent position.—See Zeitschr. f. Kinderheilk., Bd. III., 4, 1893; Brit. Med. Jour., Feb. 17, 1894; Med. Bull., May, 1893. (Abstracts, see Notes on New Rem.)

Phenacetin.—Mr. C. Platt says (in Jour. Anal. and Applied Chem.) the melting point of pure phenacetin should be very close to 135° C., and if it fall to 130° C. the sample may be suspected as impure. The presence of acetanilid is the commonest cause of a fail in the melting point, 5% of this impurity reducing the constant to 127° or 128° C. Antipyrine and paraphenetidin should also be looked for in phenacetin. The following tests will serve to identify phenacetin and to prove its purity from the above adulterants:

1. Boil the sample with hydrochloric acid, dilute with water, cool, filter, and add two or three drops of potassium dichromate to the filtrate. If the sample be phenacetin a ruby-red color will be produced.

2. Boil with water, cool, filter, and add bromine water till the solution becomes yellow. Pure phenacetin will remain clear.

3. Phenacetin will give a red color when boiled with hydrochloric acid and ferric chloride.

4. Autenrieth and Hinsberg's test.

5. Heat with alcohol and sulphuric acid; ethyl acetate will be evolved and recognized by its odor. At the same time aniline will be produced and may be recognized by yielding phenylcarbamine when the solution is heated with chloroform and potash.

6. Alcohol will be evolved when phenacetin is boiled with potash; this distinguishes it from acetanilid.

7. To a well-cooled solution in strong HCl, add chlorine water; phenacetin gives a red color; acetainilid a blue which afterward fades.

8. Potassium permanganate added to the HCl solution gives a violet color, which changes to dark ruby-red with phenacetin, but a green color with acetanilid.

9. Weak chlorine water gives a red color in a dilute HCl solution of phenacetin, but a yellow color, becoming dark green with one of acetanilid ; the dark-green solution gives a blue precipitate with potash.

10. The most delicate test for acetanilid in phenacetin is to heat with potash and chloroform, when acetanilid gives phenylcarbamine, but phenacetin does not.

11. The presence of antifebrin in phenacetin is detected by boiling the sample with a little water, cooling, filtering and boiling the filtrate with a little nitrous acid and Plugge's reagent (a solution of mercurous nitrate with a little nitrous acid). Antifebrin will be betrayed by the production of a red color.

12. To detect paraphenetedin in phenacetin, melt 2.5 Gm. of chloral hydrate in a test-tube, and add 0.5 Gm. of the sample ; pure phenactin will dissolve to a colorless solution, becoming pink after a time. A trace of paraphenetedin will produce a dark violet to a reddish or bluish violet, according to the quantity present.—New. Eng. Drug., 1894, 135.

Phenocoll.—The melting point of the purified base in the hydrated condition is stated by Francesco Nicola to be 113° instead of 95°, as usually given, and the anhydrous base melts at 99.5°. When phenocoll is heated somewhat above its melting point, ammonia is given off, and the residue dissolved in water gives a fine red violet color when a few drops of ferric chloride solution are added. The hydrochloride, which has hitherto been described as anhydrous, crystallizes with one molecule of water. Nicola confirms Fischer's statement that phenocoll dissolves in 20 parts of water at 15.5° to 16° C. The salt melts with partial decomposition at 254° C., beginning to cake together at 200°, and becoming slightly brown at 230°. The residue after melting, dissolved in water, and mixed with a drop of ferric chloride solution, gives an intense reddish violet color, which is considered by Nicola to be a useful means of identification (Annali di Chimica e di Farmacologia, December, 1893.—Pharm. Jour. Trans., 1894, 731. (also, Apoth. Zeit., 1894, 114).

Phenocoll Hydrochloride in Childhood.—E. Modigliano. (Notes on New Rem., 1893, 153).

Pheduretin.—A phenol derivative, composition not given ; tasteless white cryst. ; insoluble in water. Doses of 0.5 to 1 Gm., a powerful diuretic.—Alumni Jour., 1894, 17.

Phenatol consist of acetanilid, caffeine, sodium bicarbonate, sodium chloride, and sodium sulphate.—A. Welter in Pharm. Zeit., 1894, 784.

Phenol Chlorine and Bromine Derivatives.—Para-chlorine phenol, crystalline ; odor of phenol ; slightly soluble in water. Ortho-brom-phenol is a violet colored liquid. Both employed in the treatment of erysipelas; 1 to 2 per cent. in ointment.—Alumni Jour., 1894, 17.

Phenol Sulphoricinoleate is a solution of 20 parts pure phenol, i. e., carbolic acid, in 80 parts sodium sulphoricinoleate.

Para-Monochlorphenol, $C_6H_4Cl.OH$, is described as occurring in crystals which are easily soluble in alcohol, ether and alkalies, but sparingly so in water. Karpow claims it to possess antiseptic properties stronger than all other products of the aromatic series thus far known. *Orthomonobromphenol* is a dark violet liquid of a strong odor, soluble in alcohol, ether, water and alkalies. Tschuriloff has found both these medicaments very useful in the treatment of erysipelas, a 3–6 per cent. oinment, rubbed in for one or two minutes twice a day, serving to lower the temperature, and preventing spreading of the disease, without causing any irritation of the skin. He reports 20 cases cured, on an average, in three to six days.—Merck's Ber., 1893.

Phenyl-xylyl-ethane.—A complex mixture of the sulphonic acids of this body, and its homologues, combined with potash, is being used as a disinfectant.—Amer. Drug. and Pharm. Rec., 1894, 32.

Phytolene, an American anti-fat, is quite likely the phytolaccin of Claussen. This is obtained by extracting the acidified alcoholic extract with ether. This substance, phytolaccin, is crystalline, slightly soluble in water, readily soluble in chloroform, with sulphuric and nitric acids turns light yellow, and later dark yellow.—Pharm. Zeit., 1893, 425.

Picrol (Di-iodo-resorcin-mono-sulphonic Acid) is the name given a new antiseptic containing 52 per cent. of iodine, described by MM. Darzens and Dubois as being of great potency. It is prepared by adding, with constant stirring, an alcoholic solution of iodine and iodic acid to resorcin-mono-sulphonic acid. The latter is produced by treatment of resorcin with concentrated sulphuric acid by a detailed process not of moment here. The potassium salt is the one most minutely described as being in the form of colorless and odorless crystals with an extremely bitter taste. It is not considered poisonous, although too reckless use is not without danger. It is readily soluble in water and most of the ordinary solvents.—Squibb's Ephem., 1894, 1520.

Piperazine and the Picric Acid Test.—Piperazin is still too new a remedy to escape objections against its employment, which mainly depend (Notes on New Rem.) upon incomplete acquaintance with the characters of the base. Thus Roerig a short time ago reported a most unpleasant by-effect of piperazin, which, if true, might well have raised grave doubts as to the advisability of its administration. He observed that, after administration of piperazin to two persons suffering from uric acid diathesis, the urine gave a copious precipitate with picric acid, and he at once rushed to the conclusion that albuminuria was induced by the action of the piperazin upon probably unsound kidneys. This result, however, was in distinct contradiction to the observations of earlier investigators, who had administered as much as 90 grains piperazin pro die without finding albumen in the urine. The fallacy was at once evident when Biesenthal pointed out that even with 1 part piperazin in 20,000 parts water, picric acid produces a distinct precipitate, so that, considering the large proportion of the base that passes through the organism undecomposed, there is no wonder that a precipitate is formed by this reagent in the urine after administration of 15 or 30 grains piperazin. The correctness of this opinion has been practically demonstrated, and the nature of the precipitate more nearly investigated. Employing picric acid as reagent, the distinction between albumen and piperazin is best shown by the disappearance of the crystalline precipitate of piperazin picrate on warming, while the albumen compound is insoluble both in hot and cold water. In the light of this knowledge Roerig's observations lose their startling character. West. Drug., 1894, 99.

Piperazine in Diabetes.—In the Berliner Klinische Wochenschrift, of February 5th, 1894, Dr. L. Hildebrandt publishes a very comprehensive, detailed report on his observations of the effect of piperazin in experimental diabetes. He found that the pure base, even in very small quantity, readily reduced the saccharinating effect of the hydrolytic ferments (especially also those of blood-ferments.) His deductions are generally favorable, and he advises the addition of the drug to the therapeutic measures in treating diabetes. He suggests that in prescribing the remedy it will be preferable to neutralize the gastric juices by an advance dose of bicarbonate of sodium, and to give the piperazin a half hour before or after meals. —Amer. Therap., 1894, 250.

Piperazine.—A monograph with experiments.—Helbing's Pharmacol. Rec., No. xxv.

Pixol.—A soluble wood tar preparation ; 3 parts of wood-tar warmed with 1 part of soft soap, this gradually mixed with 3 parts of 10 per cent. KOH solution. It is a transparent solution miscible with water in all proportions. Disinfectant properties equal to lysol.—Alumni Jour., 1894, 17.

Pyretine has been found to be a mixture of 58.7 acetanilid, 67.4 caffeine, 19.5 sodium bicarbonate, and 13.5 calcium carbonate. Potassium bromide was also found in it some time ago by another analyst.—A. Welter, in Pharm. Zeit., 1894, 784.

Quinine Chlorhydro-Sulphate is a new salt claimed to be of great therapeutic value by its promoters, MM. Grimaux and Laborde. Its mode of preparation is not yet published, but two of its advantages over the simple sulphate are pointed out. It will dissolve in its own weight of water, thus fitting it for hypodermic use. It contains for the same weight the same quantity of quinine as the sulphate, and therefore the doses are equivalent. Little, of course, is given concerning clinical experience with it, as it has not been known long enough.—Squibb's Ephem., 1894, 1523.

Resorbin.—This is the name given by Ledermann to a new excipient for medicaments intended for external application. Almond oil and distilled water are directed to be emulsified by means of a small quantity of yellow wax, gelatin, and soap. A little wool-fat is then added to give a proper degree of consistence. It is claimed that this mixture is specially adapted for penetrating the skin without the necessity of hard rubbing, very slight friction sufficing to effect complete absorption of quite a large quantity of the "resorbin," together with any medicament incorporated with it. It has been employed as a vehicle for pyrogallol, chrysarobin, mercury, tar, naphtol, and balsam of Peru. Mercury, when present to the extent of one-third, is very rapidly absorbed, by simply spreading a thin layer over the skin and exercising a slight pressure for a short time. This mercurial preparation is also said to be free from any unpleasant smell.—Rif. Med., through Brit. Med. Journ. Epit., 1732, 39.

Resol.—This is the name of a new disinfectant which has been introduced in Germany. Creolin appears to be its prototype. It is made by saponifying 1,000 parts of wood-tar with 9 parts of caustic potash, and adding 200 parts of an indifferent body, such as wood spirit. Resol, which is proprietary, is said to be an active bactericide, killing typhoid, anthrax, and similar bacilli in five or ten minutes with 3 per cent. solution.—Chem. and Drug.; Amer. Drug. and Pharm. Rec., 1894, 32.

Resorcylalgin.—Antiseptic; made by the action of potassium resorcylate on antipyrine. Potass. resorcylate (resorcinate) is made by boiling 1 part resorcin with 5 parts $KHCO_3$ and ten parts water. Resorcylalgin is slightly soluble in water, very soluble in alcohol. Because of its strong acid properties it forms soluble salts with alkaline bases.—Alumni Jour., 1894, 17.

Resorcin for Keloid.—Resorcin has lately been recommended for the treatment of keloid. It should be applied in combination with cacao butter, taking ten per cent. of resorcin, and it is said that relief is complete and permanent. Resorcin is also used to detect disease of the cornea of the eye. One drop of a 10 to 20 per cent. solution produces in the healthy eye a reddish coloration at once, which disappears with aid of a little water. If the cornea is affected, a more or less red color is imparted, which will persist for 20 minutes or so.—Amer. Therap., 1894, 48.

Rubidium Iodide.—The Stassfurt potassium salts furnish the source of this base. The iodide is offered as a substitute for the corresponding potassium and sodium salts; inodorous white crystals; milder taste; permanent in air; more soluble than KI; free from disturbances produced by the potassium base in KI.—Alumni Jour., 1894, 17.

The Detection of Saccharin in Presence of Salicylic Acid.—The methods for isolating these two substances consist in extracting the acidulated solution with ether and evaporating; this residue will contain both saccharin and salicylic acid if they are present in the material to be investigated, and to positively identify the former has been a matter of difficulty. A method proposed by Hairs is quite easy. The mixture obtained from the ethereal solution is dissolved in water acidulated with hydrochloric acid and the salicylic acid precipitated completely as brom-salicylic acid by adding bromine water, agitating, filtering, expelling the bromine from the filtrate by a current of air, extracting with ether and evaporating after adding a few drops of a sodium bicarbonate solution; the residue has the intense sweet taste of saccharin, and after fusion with potassium hydrate will give the test for salicylic acid which has been produced in the decomposition of saccharin.—(Journ. d. Pharm. d'Anvers) Apoth. Ztg., 1893, 500.

Employment of Saccharin in the Preparation of the Fine Grades of Liquors.—A translation and condensation from Chem. Tech. Gewerbebl., 1893; Nat. Drug., 1893, 47.

Saccharin.—Its manufacture and uses in pharmacy, by H. Wall.—Amer. Drug. and Pharm. Rec., 1893, 302.

——— The chemistry of saccharin with additional notes from B. Fischer's "Neueren Arzneimittel," 6th Ed., page 198.—Meyer Bros. Drug., 1894, 143.

Saccharin in Pharmacy.—Preparations for *mixtures* of saccharin solution in dilute alcohol and for *powders* a saccharin mixture with mannite, both being in such proportions that 1 Gm. of the solution or of the mixture (powder) corresponded in sweeting capacity with 10 Gms. sugar or 15 Gms. syr. simplex. For full list of preparations into which these may enter, see Montreal Pharm. Jour., 1894, 44.

Salacetol, the ester of salicylic acid and acetylcarbinol, is a synthetic product intended to replace sodium salicylate and salol, especially the latter, because of the fear of poisoning by carbolic acid, which is liberated when salol is taken into the system. Salacetol, $C_6H_4(OH)COOCH_2COCH_3$, is made by heating monochloracetone $CH_2ClCOCH_3$ with sodium salicylate; it crystallizes from alcohol in fine lustrous needles, from benzin in scales; it dissolves only slightly in cold water and cold alcohol; it is more soluble in these solvents when hot; it is easily soluble in ether, carbondisulphide, chloroform, benzole, benzin, etc. It has a slightly bitter taste and melts at 71° C. The aqueous solution gives a violet color with ferric chloride; agitation with dilute solution of sodium hydrate (0.6 per cent.) saponifies it, yielding a clear solution which, upon acidifying with hydrochloric acid, separates approximately seventy-five per cent. salicylic acid. The dose for an adult is 2.0–3.0 Gm., which administered with 30.0 castor oil has been found very successful in the treatment of diarrhœa; the dose is taken before breakfast, and can be repeated for several days; 0.5

Gm. is a harmless daily dose for a child one year old.—Pharm. Ztg., 1893, 496.

Titration of Salacetol with $\frac{N}{10}$ KOH Solution.—H. Eckenroth and C. Koch titrate the salacetol with alkali, using phenolphthalein as an indicator. For neutralization of 0.5 Gm. substance, 26 C.c. of $\frac{N}{10}$ KOH is required = 2.6 C.c normal alkali. Then 1 C.c. of normal alkali corresponds to 1 C.c., salacetol = 0.194 Gm. Then as 2.6 = 0.194 then 2.6 = 0.50 Gm. salacetol. 0.5 Gm. of salacetol requires for neutralization 26 C.c. $\frac{N}{10}$ normal alkali.—Pharm. Zeit., 1893, 593.

Salicylacetol.—(See Salacetol).

Salicylide and Poly-salicylide are prepared as follows: Equal parts of salicylic acid and phosphorus oxychloride are mixed with twice their weight of an indifferent solvent, such as toluol or xylol, and warmed. The products of the reaction, consisting entirely of two compounds—salicylide and its polymer—can be separated by means of chloroform. In this, salicylide is soluble, and its polymer insoluble. Salicylide melts at 260–261° C. and has the constitution $C_6H_4CO.O$. The polymeric compound, polysalicylide, melts at 322–325° C. and appears to have a molecular weight exactly four times as great as salicylide, as shown by the freezing-point method. Both compounds are converted gradually into salol when allowed to stand with phenol and an alkali.—Ibid., 418.

Salipyrine (Antipyrine Salicylate) has now been attainable in this country since December last, after the conflicting proprietary interests had been adjusted, so that now the difficulty alluded to here last year of obtaining this agent has been removed. Notwithstanding this incentive to more general use, nothing has been reported to show that far better results cannot be obtained from the administration of the two component ingredients in proportions varying with the circumstances of each case, rather than being compelled to give the proportions offered in the compound.—Squibb's Ephem., 1894, 1525.

——— *Electrical Exhibitions of.*—It has been observed by Schrijnen (Pharm. Centralh.), that, when crystals of salipyrine are crushed, electric sparks of considerable intensity are generated. These discharges are probably due to the generation of electricity by the friction of opposing crystalline surfaces.—Ibid.

——— In cases of rheumatism, when given in the early stages, according to Henning (Med. Record), is most efficacious in relieving the pain and reducing the swelling of the affected parts. In simple colds and acute coryza it exerts a very favorable influence upon the headache and general malaise. Its action in influenza must be regarded as almost specific. In cases of uterine hæmorrhage, not due to the presence of tumors, or occurring in childbirth, salipyrine is much more efficacious than any other known remedy. The drug is absolutely safe and gives no unpleasant after-effects. It is best given in the afternoon, in rather large doses, repeated at short intervals. The total daily dose ranges from 7½ grains to 2 drams, according to the age of the patient and the disease. The remedy has no cumulative effect, nor do those taking it acquire a habit.—Western Drug., 1893, 220.

——— *In Uterine Hemorrhage.*—Kayser (Deutsch. Med. Wochensch., Oct. 29, 1893).—Notes on New Rem., 1893, 136.

Salol Camphor.—In preparing this compound in the crystalline state, M. Barnouvin found that a mixture of 3 parts salol to 2 of camphor showed the first formation of crystals only after several days, and that as the proportion of camphor is diminished the crystallization is more rapid, a mixture of 9 Gm. salol and 1 Gm. camphor crystallizing after a quarter of an hour. The process of preparation consists of fusing the two pulverized substances in a porcelain mortar at a gentle heat, and allowing them to crystallize; it is advisable to place the crystals on filter-paper from time to time; the crystals thus obtained are dry, white and brilliant, possessing the combined odor of salol and camphor. In pulverizing them a powder is produced which is soft to the touch, less unctuous and less white than salol in powder.—Jour. Pharm. Chim., 1893, 363.

A New Salol Reaction.—To a small quantity of salol contained in a porcelain dish add concentrated sulphuric acid. It will turn yellow, brown, and finally green. Now add water and stir, and the mixture will turn red, but will again become greenish if ammonia is added. When resorcin is so treated a dark blue color first appears, which on addition of water turns red, and then becomes blue on the addition of water.—Jour. de Pharm. d'Anvers, 1893.

Salocoll—Phenocoll Salicylate.—The salicylate of the well-known remedy, phenocoll, which has been employed chiefly as hydrochloride. The after effects produced by the soluble salts of this base are absent in this, probably because of its insolubility; mild and reliable antipyretic, antineuralgic; in doses of 1 to 2 Gm. several times daily. Specific in influenza. —Alumni Jour., 1894, 17.

The Manufacture of Salol by a recent German patent depends upon the formation of salicylide $(C_7H_4O_2)_4$ and polysalicylide $(C_7H_4O_2)_n$, by the action of phosphorus oxychloride upon solutions of salicylic acid in indifferent solvents like toluol, etc.; polysalicylide and phenol heated to a temperature of 210–220° C. (best under pressure), react together, forming salol, which is afterwards separated by fractional distillation and purified by recrystallization.—Apoth. Ztg., 1894, 40.

Liquid antiseptic salol was described by P. Reynier before the Soc. de Biologie as a product worthy of various applications in surgery. It fuses at 40–42° C., and then remains liquid below that point for some time. Beside the combination with camphor, it combines also with iodoform and aristol, with which substances it forms fluid and easily injectable mixtures.—Rev. de thér. méd.-chir., 1893, 404, Amer. Jour. Pharm., 1893, 451.

Salol and Cresalol—Determination of.—L. Bartle considers the determinate of these two substances and salol dressings.—Jour. Pharm. Chim., 1804, 489.

Salumin, or Aluminum Salicylate, is recommended for inflammation of the nose and throat. It is said to combine the antiseptic properties of salicylic acid with the astringent properties of aluminum. It is insoluble in alcohol and water, but is soluble in alkalies. With ammonia it forms a neutral double salt, which is soluble in water and glycerin, and keeps well in concentrated solution, while the dry compound soon decomposes and is partly converted into a compound which is insoluble in ammonia.—Pharm. Zeit., 1893, 779. See also Wien Med. Presse, 1893, p. 1894.

Sanatol is another new disinfectant, described (Oesterr. Sanitätswesen) as a blackish-brown, rather thin fluid, having a tarry odor and a strongly-acid reaction; soluble in water with a milky turbidity and a subsequent precipitation of resinous little flakes. Investigation apparently shows that the article is prepared by treating not fully-purified so-called "100 per cent. carbolic acid" with an excess of concentrated sulphuric acid, and diluting with water. Sanatol is reported to be a quite efficacious disinfectant. A 1 per cent. solution killed cholera vibrios within half a minute; a 2 per cent. solution is said to have destroyed the Bacterium coli commune in one-half, and the Micrococcus pyogenes in one minute; but it proved much less efficient against anthrax spores, which were killed, even by a 20 per cent. solution, only in six days. Owing to its physical properties, sanatol can only be used for coarse disinfection, not for surgical purposes.—Pharm. Zeit., 1893, 544.

Sanguinal, a blood-forming medicament, contains 10 per cent. of pure oxyhæmoglobin, 46 per cent. of the salts existing in the blood, and 44 per cent. of freshly-peptonized muscular albuminoids.—Pharm. Centralh., 1893, 687.

Sedatin (Paravalerylamidophenetol).—It may be prepared by the action of para-amido-phenetol upon valerianic acid or of the chlorhydrate of this amido compound upon sodium valerianate. It occurs in fine, crystalline needles melting at 350 to 360 degrees C. It is sparingly soluble in benzine, ether, chloroform, and acetone, quite soluble in boiling alcohol, but less in the same liquid when cold. As its title indicates, it is to be used as a sedative.—West. Drug., 1893, 326.

Solphinol is a new French antiseptic, consisting chiefly of borax, boric acid and alkali sulphites. It occurs as a white, odorless, crystalline powder, which is soluble in about 10 parts of water and 20 parts of glycerin. According to S. Bernheim, solphinol, in 2½–10 per cent. aqueous solutions, is an eligible surgical disinfectant, particularly in malignant wounds. Its inodorousness and its indifference toward metallic instruments are two properties in its favor.—Merck's Bericht, 1893.

Somnal-beer.—A new harmless preparation for insomnia. It consists of somnal and malt-beer. The small vials contain forty drops or two grams of somnal, the administration of which leaves no bad effects whatever as do other like preparations. In ten or fifteen minutes after the administration, sleep lasting from six to eight hours will be the result.—Meyer Bros. Drug., 1894, 21.

Sodium Caffeine–Sulphonate or Nasrol.—Henning and Liebrecht produced caffeine-sulphonic acid and its salts, which promises to possess the required properties, for while having lost the secondary action upon the vaso-motor center, its really somatic uropoetic action remains unimpaired. Sodium caffeine-sulphonate does not irritate the gastro-intestinal canal, and is without effect on peristalsis. Its taste being intensely bitter, it is given in capsules in 1-grain doses, repeated from four to six times a day. The lithium and strontium salts are also prepared and given in similar doses.—West. Drug., 1893, 480.

Somatose is a meat preparation containing large quantities of albumoses, with very little peptone; it is claimed to be more easily assimilated and more agreeable than the usual meat preparations containing considerable peptones.—F. Goldmann, Südd. Apotheker Ztg., 1893, 529; Amer. Jour. Pharm., 1894, 34.

Spermin (testicle juice) is still warmly advocated by Brown-Séquard, as he has now reached the large number of 100,000 injections, according to his own report, with a gratifying proportion of successful cases. Few conservative observers, however, have sufficient faith even in its theoretical promises to carry on any systematic study, and have left the field pretty clear for the originator's own manœuvres. A. W. Poehl, however, believes that he has recently proven that spermin possesses a catalytic action in relation to general oxidation, and an "intra-organic oxidation" of leucomaines in particular, and, therefore has published his investigation of its effect on cholera microbes. He apparently has satisfied himself, if no one else, that this agent checks the formation of the ptomaines.—Squibb's Ephem., 1894, 1530.

Spasmotin (*Sphacelotoxin*).—Spasmotin is a poisonous element of ergot; its action is characterized by causing spasms of the small arteries, which may lead to hyaline thrombosis of the latter and to gangrene of the tissues supplied by them; it also has, just as ergot itself, a stimulating effect on the pregnant uterus. The method for producing spasmotin is based on its solubility in ether and its insolubility in petroleum ether. The spasmotin is extracted from ergot direct by ether and precipitated by addition of petroleum ether; or the oil contained in ergot is first removed by extraction, and the spasmotin extracted by ether from the ergot. By both methods the spasmotin is obtained free from oil and other admixtures, in an undecomposed chemically pure state, as a yellow powder of amorphous appearance; it is insoluble in water, in diluted acids and petroleum ether, but very easily soluble in ether, and in alcohol, acetic ether, benzol, etc. Spasmotin forms salts with alkalies, and may be again precipitated by carbonic acid. From benzol it may be obtained in crystals. The compound may be expressed by the formula $C_{20}H_{21}O_9$.

The pharmacological effects of ergot are inherent in spasmotin and its soda salt. The latter is suitable also for subcutaneous application, as it does not produce local disturbance of any kind.

Experiments made in the obstetric clinic of Freund proved that spasmotin yields the same effects as are obtained with Secale cornutum. Doses up to 1 Gm. may be given without hesitation; but the doses employed in satisfactory experiments so far, have ranged only from 0.04 to 0.08 Gm.—Amer. Therap., 1894, 295.

Steresol.—It is an antiseptic varnish for use in diphtheria and several skin diseases, and is said by Blanc (Rev. de Thérap., lx., 407) to consist of equal parts of gum lac, benzoin, and balsam of tolu, dissolved in a sufficiency of alcohol, together with 10 per cent. of carbolic acid. Another formula, given in Les nouveaux remèdes, is as follows: Purified gum lac, 270 Gm.; purified benzoin, 10; balsam of tolu, 10; crystallized phenol, 180; oil of cassia, 6; saccharin, 6; alcohol, sufficient to make one litre.—Rép. de Pharm., 1893, 362.

Strophanthin Tannate is described as a yellowish-white, amorphous powder, containing 58.14 per cent. of strophanthin, and soluble in alcohol. The therapeutic indications for this compound are the same as those for the glucoside itself. The following formula is recommended:

Strophanthin tannate	3 centigr.	[½ gr.]
White bole	2 grammes	[31 "]
Mucilage tragacanth	enough to make 30 pills.	

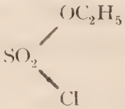
Coat with gold leaf!—One pill twice daily.

—Merck's Bericht, 1893.

Sucrol—Properties and Uses.—It is best used in the crystalline state. Sucrol melts at 160° C., and is soluble in all parts in alcohol, ether, acetic acid, and warm hydrochloric acid. Its solubility in water depends upon the temperature of the latter, 100 C.c. of water at 20° C. dissolving 16 Cgm., while at 80° C. the same quantity of water dissolves 65 Cgm. of the substance. Paschkis declares sucrol to be absolutely innocuous, even when employed in large quantities, affecting neither respiration, circulation, nor digestion, and that it may be used as an aliment, or mixed with alimentary substances. It has, however, no real alimentary value, and can not, therefore, be considered as a true succedaneum of sugar. This is, to a certain extent, a virtue, inasmuch as it can be used as a sweetener of alimentary substances in all cases where sugar is forbidden. Its taste is purely sweet, without a trace of any after-taste. Its greatest use, therefore, will be in the preparation of syrups, and in sweetening liquids of high specific gravity. Its sweetening power is about 200 times that of sugar. In its amorphous form the powder has the disadvantage of being dampened with great difficulty, but in its crystalline state this trouble entirely disappears; all that is necessary is to pour the liquid (coffee, for example) over it. It is powerless, like sugar, in the masking of any extremely bitter taste, like that of quinine, etc. On the contrary, it adds, to some persons, an element of nauseousness to such preparations. In conclusion, sucrol may be considered as a sweet and agreeable condiment against the use of which there is not a single valid objection.—Nat. Drug., 1893, 73.

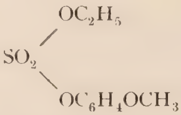
Purity of Sulphonal.—The various products used in manufacturing sulphonal may be left, in traces, as impurities. The pure compound should be perfectly white and inodorous; it should have no appreciable bitter taste. Its melting point should be 125.5° C. and should not deviate from this by more than .2°. A saturated solution in water should be without effect at ordinary temperature on a .1 per cent. solution of potassium permanganate. When 1 Gm. is boiled in 10 C.c. of water no odor should be produced. If there should be any, it is probably due to mercaptol.—Ibid.

Some New Sulphonic Esters.—The principle involved in their preparation is the heating of an alkyl sulphonic chloride with an alkali and a phenol. The chief body treated of is the ethyl and guiacol compound. Ethyl-sulphonic chloride



$$SO_2\begin{cases}OC_2H_5\\Cl\end{cases}$$

so treated with guaiacol and alkali yields the sulphonic compound of both radicles.



$$SO_2\begin{cases}OC_2H_5\\OC_6H_4OCH_3\end{cases}$$

This body is a transparent, somewhat unstable oil, boiling at 200° C. with partial decomposition. The corresponding eugenol compound boils at 240° C. These bodies possess a strong physiological action, and are being introduced into medicine.—Pharm. Zeitung; Brit. and Col. Drug., 1894, 377.

Symphoral (Sodium Caffeine-Sulphonate.)—A diuretic of prompt action. Its scope of employment is naturally found first of all in different forms of dropsy, whether arising from heart or kidney troubles. But the remedy should also prove useful in obesity and in fatty heart in conjunction with the Oertel treatment. The lithium salt and the strontium salt have been prepared as well as the sodium salt. Lithium salts are preferred, especially in Germany, in the treatment of gout, uric acid diathesis, gravel, etc. The remedial action of lithium will undoubtedly be favorably influenced by combination with an acid of diuretic action. By increased diuresis not only is the amount of water passed increased, but at the same time there is a more rapid elimination of the specific constituents of urine, and among these of uric acid. The strontium salt is prepared at the instance of recent French investigators, who have found that strontium salts have a most beneficial action in renal inflammation. If this action of strontium is substantiated by experience it will undoubtedly only be further aided by the combination of strontium with a diuretic like caffeine-sulphonic acid. —Amer. Drug. and Pharm. Rec., 1894, 32.

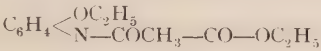
Tannal.—An aluminum tannate, energetic astringent, insoluble in water. Its double salt, aluminum tannico-tartrate, is on the contrary very soluble. This latter compound is sold by Riedel in compressed tablets, as its aqueous solution is not stable.—Pharm. Zeit., 1893, 779. See, also, Wien Med. Presse, 1893, xxiv, 1894.

——— Application like unto that of Salumin.—Riedel.—Alumni Jour., 1894, 17.

Thiol in Skin Diseases.—Laughlin (Geneeskundige Courant, 1893, 17), in herpes uses a 25 per cent. watery solution twice daily. He considers it superior to ichthyol in many cases, on account of its being without odor and non-irritating.—Amer. Drug. and Pharm. Rec., 1804, 32.

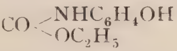
Thilanin is a combination of sulphur with lanolin, and mixes with water and oily fluids. It is available in many forms of eczema, in sycosis when inflammation is severe, and in herpes.—Notes on New Rem., 1893, 95.

Thermodin.—An acetyl-p-alphoxyphenyl urethane.—E. Merck.



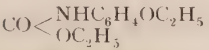
$$C_6H_4<\begin{matrix}OC_2H_5\\ N-COCH_3-CO-OC_2H_5\end{matrix}$$

In p-oxyphenyl urethane



$$CO<\begin{matrix}NHC_6H_4OH\\ OC_2H_5\end{matrix}$$

the H of the hydroxyl group is replaced by an ethyl group, thus:



$$CO<\begin{matrix}NHC_6H_4OC_2H_5\\ OC_2H_5\end{matrix}$$

This body is antipyric, but not free from side effects; it is acetylated, yielding thermodin. This forms white needles, odorless and tasteless, melts at 86° C., and only soluble 1 in 2600 of water. Antipyric dose is 0.5 Gm.—Alumni Jour., 1894, 89. See Nouv. Rem., No. 9.

Thiosapol is the generic name given to a group of soaps chemically combined with sulphur (Pharm. Ztg., 1893, 663). Thiosapol Cocoa-nut oil soap (containing about 5 per cent. of sulphur), is prepared as follows: 500 parts of linseed oil and 83 parts of sulphur are heated together to 120–160° C., that is, until the sulphur is dissolved and does not separate on cooling. 500 parts of this solution are melted with the same quantity of cocoa-nut oil, and when cooled down to 25° C., incorporated with 500 parts of a 35 per cent. soda solution, and set aside until saponification is completed. Thiosapol sodium is obtained by heating 100 parts of oleic acid with 12 parts of sulphur, mixing the resulting product with 60 parts of a 25 per cent. soda solution, and removing the excess of liquid by expression. The sulpholeic acid may also be dissolved in 200 parts of 90 per cent. alcohol, saponified by 43 parts of 35 per cent. soda solution, filtered, and the filtrate evaporated to dryness on a water bath at 50° C.

Thiuret.—$C_8H_9N_9S_2$—A sulphurated antiseptic. Oxydation product of phenyldithiobiuret. Inodorous crystalline powder, insoluble in water; soluble in alcohol and ether. Has the property of giving up sulphur readily (statu nascendi) upon which its disinfectant properties depend. As best adapted salt of this basic thiuret, is the para-phenolsulfonate, a yellow crystalline inodorous powder which can be employed in solution, as well as dry antiseptic.—Alumni Jour., 1894, 17; also, Deutsch med. Wochenscchr., 1893, 177.

Thioform, a substitute for iodoform, is a basic bismuth dithiosalicylate; attention is called to it in the treatment of ulcers and diseases of the eye and skin.—Pharm. Ztg., 1893, 426.

Thymol as an Intestinal Antiseptic.—A. N. Collins, in The Physician and Surgeon, recommends pills of thymol of the strength of two and a half grains each, administered every four or five hours, as his favorite intestinal antiseptic in cases of typhoid fever.—Notes on New Rem., 1893, 118.

Tricresol.—A purified mixture of the cresols present in coal tar, soluble in water to the extent of 2.2–2.5 per cent.; specific gravity 1.042–1.049 at 20° C.: boiling point, 183–202° C.; perfectly soluble in dilute alkali.—Pharm. Ztg., 1893, 751.

——— The so-called "crude 100 per cent." carbolic acid is known to consist mostly of cresols, which, however, are but very little soluble in water, owing to the impurities, it is maintained. If these be removed, there will result a clear liquid, tricresol, of an agreeable cresol-like odor, and soluble in cold water to the extent of 2.2–2.5 per cent., forming a clear solution of neutral reaction. The specific gravity of tricresol (at 20° C.), varies from 1.020–1.049, and its boiling point is between 185 and 205° C. As to its disinfectant value, a 1 per cent. aqueous solution is reported to equal a 3 per cent. carbolic acid solution. Gruber recommends the 1 per cent. solution as the most serviceable for surgical purposes; a ½ per cent. solution, however, is said to be sufficient in many cases. Tricresol solutions do not attack the instruments, it is claimed.—Pharm. Zeitschr. f. Russl., 1893, 774.

Tuberculin.—W. Kühne. Koch's purified tuberculin contains about 10 per cent. of proteid matter, and it is to this and the changes it undergoes under variations of culture, that the present communication chiefly relates. The separation of the proteids from one another by neutral salts was similar to that usually adopted, and the properties and tests for each are fully described. There were found (1) an albuminate; (2) special albumoses, for which the name acro-albumoses is proposed; (3) a deutero-albumose; and (4) traces of peptone. About one-fifth of the solid matter present is mineral in nature. Koch's tuberculocidin appears to contain small quantities of the same substances; but, if these are removed by alcohol, the substance is not rendered wholly inactive.—Zeit. Biol., 1893, 221; Jour. Chem. Soc. (Abs.), 1894, 108.

Tuberculin as a Diagnostic Agent.—Koch's tuberculin is now admitted by scientists to be a valuable diagnostic agent for the determination of tuberculosis in cows, but no records have been made so far, to show that these animals are free from the disease after inoculation.—Amer. Therap., 1894, 262.

Ulyptol.—The Pharm. Centralh. claims that ulyptol is the very identical preparation formerly known as eucalyptol, the composition of which was published in Pharm. Centralh., 1886, 599, and is as follows:

Salicylic acid	6 parts.
Carbolic acid	1 part.
Oil of eucalyptus	1 "

Uricedin.—Prepared by clarifying freshly expressed lemon juice, and adding for every 50 parts of citric acid (calculated as anhydrous) 20 parts of pure 95 per cent. sulphuric acid, and 4 parts of pure 25 per cent. hydrochloric acid, finally adding sodium carbonate until the mixture has only a slightly acid reaction. Add one part of lithium carbonate to sufficient lemon juice to exactly neutralize it, mix this solution with the first, evaporate to dryness and granulate. So prepared the mixture contains:

Sodium sulphate	27.5 parts.
Sodium chloride	1.6 "
Sodium citrate	67.0 "
Lithium citrate	1.9 "
	98.0 "

It is therefore merely a mixture and not a "synthetic salt," as it was termed in the Wiener Medicinische Blätter. A. Schneider found (Pharm. Centralh.) one specimen of the uricedin to be strongly alkaline, whereas it should be, and later specimens were, slightly acid in reaction. Goldmann states (Pharm. Zeit., 1893, p. 317) that he failed to find any lithium in a sample; but Schneider, on the contrary, did find lithium, though he did not estimate it quantitatively. A preparation termed Uricedin Cakes II. is furnished by the manufacturer as being free from starch and sugar. These cakes are said to be made of hazel-nut meal, each cake containing 1 Gm. (15 grains) of uricedin and 0.15 Gm. (2¼ grains) of citric acid.

Uropherin, a New Diuretic—Uropherin is the name applied to the salt theobromine-lithium and lithium salicylate. It is a white powder, soluble in about 5 parts of water. Experiments with this new theobromine combination by C. Gram have shown that it is absorbed much more readily than diuretin, and that the therapeutic effects are obtained with doses of 3–4 Gm., just as well or even better than with 6 Gm. of diuretin. It is prescribed in 1 : 15 solution in distilled water, a tablespoonful 3–4 times a day; or in the form of gelatin capsules, each containing 1 Gm. of the medicament: 1 capsule 3–4 times a day, followed by a glass of water. Uropherin has been tried on 12 patients; in 7 of these (6 cases of disease of the heart with degeneration, and 1 case of acute nephritis), very vigorous diuretic effects showed themselves; in 2 cases (of heart disease with severe organic lesions), a good but transitory effect was observed; and in 3 cases, (of cirrhosis of the liver, chronic nephritis, and Basedow's disease, all with œdema) only a slight or no effect was obtained. Uropherin is reported to have as little direct effect on the heart as diuretin, but the action of this organ often becomes more regular and the pulse stronger, being greatly facilitated by the removal of œdema and circulatory stases. Untoward by-effects have been noticed as little as with diuretin. A combination of uropherin and digitalis has often produced an excellent result.—Merck's Bericht., 1893.

Vasogen or Vaselinum Oxygenatum.—A name given to mineral oils, which are impregnated in a secret manner with oxygen; they are capable of emulsifying with water, and will dissolve many remedial agents like iodoform, creosote, ichthyol, menthol, pyrogallol, camphor, pyoktanin, etc., causing their ready absorption; by heat the oils lose the emulsifying properties. The solution of creosote in vasogen taken in milk is stated to be preferred by the patients to any other mode of creosote administration.—M. Dahmen, Pharm. Ztg., 1893, 510. See Rundschau, 1893, No. 34.

Vasogens and Vasogenins.—Vasogen is a feebly alkaline, yellowish-brown, thick fluid, of a specific gravity of 0.891, forming, with water, a stable, white emulsion. Its odor and taste are peculiar, but not disagreeable.—Iodoform-vasogen consists of 1.5 per cent. of iodoform and 98.5 per cent. of vasogen. The iodoform is dissolved in the vasogen without the aid of alcohol or ether, and is thus brought into an emulsifiable form.—Creosote-vasogen occurs in 20 per cent. and in 5 per cent. concentrations. It is applied externally by inunction and enema, and internally as emulsion. The creosote, being in emulsion, does not act caustically on the gastric mucous membrane, it is stated. The fact that phenols can be found in the urine of persons after inunction with this substance, proves that the medicaments rubbed in with it are absorbed.—Ichthyol-vasogen contains 1 per cent. of ichthyol.—Creolin-vasogen comes in two concentrations—25 per cent. and 5 per cent. The former is used for swabbing the throat in diphtheria.—Menthol-vasogen contains 2 per cent. of menthol, and creolin-menthol-vasogen 2 per cent. of creolin and 1 per cent. of menthol. Both concentrations are employed in affections of nose and ear.—Pyoktanin-vasogen (2 per cent.) is used against carcinoma (as injection and internally); whilst turpentine-vasogen is employed against tuberculosis and catarrhal affections.—Camphor-vasogenin, a solution of camphor in chloroform and vasogen, applied by inunction, it is said to have a prompt anodyne effect in sciatica, rheumatism, gout, etc.—Menthol-vasogenin contains 25 per cent. of menthol; it is said to act much more rapidly than other menthol preparations.—Creolin-vasogenin contains 50 per cent. of creolin: it is reported to be an absolutely innocuous, non-caustic antiseptic, clearly soluble in distilled water. According to Dahmen, it is much superior to carbolic acid. It is recommended for sterilizing instruments, as it does not affect their cutting edge; it protects them against rust, and does not render the handles slippery. Nor does it, it is said, affect the skin, even after having been used very frequently—Bayer (Rev. de Laryng., d'Otol,, et de Rhinol.) calls these vasogens "oxy-vaselins," and recommends them as very serviceable for internal administration, particularly in chronic bronchitis, asthma, whooping-cough, and tuberculosis. In tuberculosis he gives in the beginning 2–5 drops of creosote-vasogen, in pure water (warm or cold), followed by a glass of milk or a little cognac. If possible, a few drops of the same remedy are administered at the same time per rectum. The dose of the drug per os is gradually increased one or more drops a day, until 20 drops three times a day is reached—creosote-vasogen is said to be easily assimilated, and not to produce gastric disturbances. Bayer states that the action of the heart becomes regular; that fever disappears, the night-sweats are greately diminished and often disappear; also, that respiration is relieved, and the digestive functions are much improved. Strengths returns, and the body-weight increases. He claims to have obtained excellent results also in tubercular diseases of the larynx accompanied with serious lesions, such as tuberculo-ulcerous infiltrations, and œdematous perichondritis with stenosis of the larynx.—Pharm. Centralh., 1893, 689.

Vaselon is a new ointment-base stated by M. Villon (Bull. Comm., 1894, 138) to be a solution of stearon and margaron in neutral mineral oil. Stearon is prepared by distilling stearin with lime—3 parts of stearic acid with 1 part of dry, powdered lime—in a cylindrical retort at a temperature above 400° C.; it melts at 86° C. Margaron is prepared by distilling beef-suet with lime (as in the case of stearon). To obtain vaselon, dissolve 3 parts of margaron and 1 part of stearon in 20 parts of thoroughly purified and odorless mineral oil. The fatty product obtained after cooling resembles vaselin, but is not as transparent. It is white, odorless, neutral, and unaffected by acids and chemical reagents. It is said to possess all the properties of vaselin.

Viscoid.—The action of caustic alkalies upon cellulose gives rise to a swollen transparent mass which, after several hours' maceration in carbon disulphide, is transformed into viscoid, an extremely viscid mass, which is soluble in water. This process is reported to have been patented (Pharm. Centralh., 1894, 54). On allowing viscoid to dry on a horizontal glass-plate, a transparent film of cellulose remains behind, which can be freed from the salts by washing out with water or some acid, and can then be detached. Wire netting, textile fabrics and paper may thus be coated with cellulose.

Vutrin.—A concentrated meat extract in powder form, one part of which represents the nutritive value of four parts of beef.—Alumni Jour., 1894, 89.

Xylenol Salols.—Made by the action of dehydrating agents on a mixture of salicylic acid and xylenol, yielding ortho-, meta- and para-salicylate of xylenol. Physically and chemically resembles the well-known salols; insoluble in water, alcohol and ether; without any noticeable taste or odor. Employed as intestinal disinfectants.—Ibid.

Zinc Borate, $ZnB_4O_7+7H_2O$, is a white, amorphous powder; it has been recommended by Kollo as a dusting-powder for the treatment of wounds. Prepared by mixing solution of 5 parts zinc sulphate in 50 parts water, with solution of 4 parts borax in 100 parts water.

Zinc and Calcium Cyanide is a new double-salt of the formula $ZnCa(CN)_4$; it occurs in the form of small, white crystals, which are soluble in water.

GENERAL.

Chemists and the Census.—Editorial on the statistics of chemists, etc., embodied in the census report for 1891.—Chem. and Drug., 1894, 366.

Pharmacy in the "Annexed Provinces."—M. Jehl (Ibid., 1893, 707). It appears that Alsace, with a population of 1,500,000, has 229 pharmacists—say, one pharmacist for every 6,900 inhabitants. In the city of Strasburg, however, the scale is increased, there being 30 pharmacies for 125,000 inhabitants, or 1 per 4,000. This is about the average proportion in France.

Chemists in Great Britain.—9,000 according to Kellig's Directory. One to every 3,800 possible customers.—Ibid., 321.

Medical and Pharmaceutical Professions in Italy.—While Italy has 36 pharmacists per 100,000 of her inhabitants, the German Empire has but 13.3; Prussia, 11.9; Bavaria, 15.5; and Austria, 9.3.—Drug. Circ., 1894, 34.

Apothecaries and Physicians in Switzerland.—

			To 10,000 Inhabitants are of	
Year.	Physicians.	Apothecaries.	Physicians.	Apothecaries.
1890	1530	459	5.2	1.6
1891	1557	463	5.3	1.6
1892	1634	501	5.5	1.7
1893	1656	503	5.5	1.7

—Pharm. Post, 1894, 19.

Pharmacy in Germany.—R. J. Blackham writes about the apothecary of Germany with the preliminary requirements and subsequent education. Also about the price list fixed by the Crown for most towns in Northern Germany.

	Marks.	Pfennigs.
Mixtures, 8 ozs.	1	80
Mixtures, 6 ozs.	1	50
Mixtures, 2 ozs.	1	20
Pills, per doz.	½ to 1	0
Liniments, per ounce	0	40 to 80
Lotions, per ounce	0	20 to 30
Syrups, per ounce	0	40 to 60
Powders, per doz.	1	50
Blisters	⅓ to 1	0
Plasters, usual size, for back	1 to 2	0
Inhalations, per ounce	0	60 to 80
Granular preparations, per ounce	0	40 to 80

—Amer. Drug. and Pharm. Rec., 1893, 56; from Brit. and Col. Drug.

Chemists and Doctors in South Africa.—At a meeting of the chemists of Kimberly and Beaconsfield, South Africa, held on April 25th, the following resolution was unanimously adopted: "That the Colonial Pharmacy Board be asked to oppose the granting of chemists' licenses to doctors, and that this meeting strongly protests against the present Act being amended so as to allow doctors or others to obtain chemists' licenses without first complying with the requirements of the Medical and Pharmacy Act No. 34 of 1891."—Chem. and Drug., 1894, 756.

Importation of Drugs into China.—Statistics, see Chem. and Drug., 1893, 38.

——— Ceylon.—Chem. and Drug., 1893, 38.

——— Peru.—Ibid., 162.

——— U. S.—See Amer. Drug. and Pharm. Rec., 1894, 70; Chem. and Drug., 1894, 28; Pharm. Era, 1894, 87.

——— Guatemala.—Chem. and Drug., 1893, 179.

——— Servia.—Ibid., 528.

London Drug Statistics.—Figures relating to the stock of drugs in London warehouses, and to the imports and deliveries from time to time.—See Chem. and Drug., 1893 and 1894.

The Price of Chinese Produce.—Mr. Jamieson gives tables showing the average price in Shanghai of the chief kinds of Chinese export goods for the last 23 years.—See Chem. and Drug., Oct., 1894, p. 583.

Medicinal Substances used in Arabia in the 13th Century.—E. Stickenberger in Pharm. Post, 1893, 337.

The Siamese Drug Trade.—A report by the British Consul.—Chem. and Drug., 1894, 260.

Anglo-Chinese Pharmacy.—Chem. and Drug., 1894, 146.

Pharmacy in Davoz Platz—A Sanitarium in Switzerland.—S. M. Burroughs, in Chem. and Drug., 1893, 181.

The Pharmacist in the Far East.—W. E. Fales, Vice-Consul, Amoy, China, writes about the business side of the pharmacist in China.—Amer. Drug. and Pharm. Rec., 1893, 351.

Pharmacy in France.—Leo Eggers, in Pharm. Post, 1893, 353.

Pharmacy in Japan.—Ogata (Chem. and Drug., 1894, 736). Medical students must have followed an eight-years' course at a Japanese University before they are permitted to present themselves for the medical qualifying examination. A few of the most promising graduates are annually sent to Germany by the Japanese government for further training, and these men upon their return are usually appointed University professors. As a rule, the offices of physician and pharmacist are combined in the same person.

Pharmacy in India.—Abstracts from an article in the Indian Journal of Pharmacy (Calcutta) containing a resumé of the state of pharmacy in Hindoostan.—Brit. and Col. Drug., 1894, 350.

A London Apothecary Shop.—V. Fassati, in Pharm. Post, 1893, 353.

Pharmacy in Mexico.—D. H. Galloway.—Registered Pharm., 1893, 197.

——— A. Valasco Quiros.—Ibid., 234.

——— W. E. Curram, in Meyer Bros. Drug., 1894, 44.

——— A. Velasco. Being a report on the general conditions of pharmacy in Mexico.—West. Drug., 1893, 395.

Paris Pharmacies.—Statistics, etc., by Sterling Helbig.—Amer. Drug. and Pharm. Rec., 1894, 180.

Pharmacy in Persia.—M. Bonati.—Jour. des Pharm.; Registered Pharm., 1893, 316; Pharm. Jour. Trans., 1893; Drug. Circ., 1893, 280.

Pharmacy under the White Tsar.—Vladimir Knipowitsch writes about the pharmacy in Russia.—Amer. Drug. and Pharm. Rec., 1894, 87.

Pharmacy in Switzerland—The Conditions and Future of.—A review of the situation as based upon an article which appeared in the Schweiz. Wochenschr. f. Chem. und Pharm.—Amer. Drug. and Pharm. Rec., 1893, 108.

General Meeting of the Austrian Pharmaceutical Society.—October 19th and 20th at Wien. Acct. of proceedings in Chem. Zeit., 1893, 1585.

Annual Meeting of the Austrian Apotheker-Verein.— Held in Lenz, September 17th and 19th, 1893. Account of the meeting in Chem. Zeit., 1893, 1381.

Annual Meeting of the Deutscher Apotheker-Verein in Frankfort a. M.—Account in Chem. Zeit., 1893, 1305.

Proceedings of the Austrian Pharmaceutical Society.—Abstracts of papers read in Pharm. Post, 1894, 28, 97. Noteworthy papers incorporated in the proper places in this Report.—Zeitsch. Oest. Apoth.-Ver., 1893, 635.

Annual Meeting of the Naturalists and Physicians in Nüremberg.—September 11th to 15th, 1893.—Ibid., 1338, 1362 and 1382.

St. Petersburg Pharmaceutical Society.—Account of meeting in Brit. and Col. Drug., 1894, 488.

Annual Meeting of the Swiss Naturalists' Society in Lusanne, 5–8 Sept.—An account of the proceedings in Chem. Zeit., 1893, 1337.

History of the Apothecary in Hungary during the Previous Century.—Ign. Schwarz in Pharm. Post, 1894, 61.

A Historical Pharmaceutical Exhibition in Geneva.—C. Bührer. An account of an exhibition on Dec. 26, 1893.—Pharm. Post, 1894, 13.

Annus Pharmaceuticus, 1893.—Review of Pharmaceutical Progress for the year 1893 in Pharm. Jour. Trans., 1894, 541.

Pharmacy During the First Quarter, 1894.—Review of Conditions of Pharmacy throughout the world.—Chem. Zeit., 1894, 588.

The Practice of Medicine in France During the Middle Ages.—C. Bührer, in Pharm. Post, 1893, 405.

Wholesale Pharmacy in the Eighteenth Century.—Notes from the inspection of the laboratory books of an old established wholesale house in the City of London.—Chem. and Drug., July, 1893, 146.

EDUCATIONAL.

The Pharmacist as a Man of Science.—A paper by C. M. Luxmore, having the object of stimulating the faculties for observation and of correlating daily duties in the pharmacy.—Pharm. Jour. Trans., 1893, 515.

Higher Education for the Pharmacists.—J. M. Frauers unhesitatingly claims that education will remedy the unhealthful state of affairs at present, by weeding out the incapables, who drag it down to the plane of vulgar dickering and the business will correct itself.—Bull. Pharm., 1894, 12.

The Pharmacist and his Education.—A. H. Elliott gives some views regarding the preparation of a clerk and the studies necessary in a College of Pharmacy. He especially discountenances "squeezing his education into his laboring days."—Alumni Journal, 1894, 61.

Pharmacists and Pharmacologists.—Inaugural address by J. T. Cash in Pharm. Jour. Trans., 1893, 431. It should afford much matter for reflection to such pharmacists as devote thoughtful consideration to the close relations subsisting between themselves and the medical profession, and to the proper limitation of the duties appertaining to them respectively. In pharmacology, of course, the pharmacist may be interested to as great an extent as the medical man, but, as clearly shown in the address, his special line of work is totally dissimilar to that of the latter. He must carefully study "the most advantageous way of utilizing the drug, and of preparing it in many forms for the exigencies of practice," thus affording invaluable aid to the pharmacologist and therapeutist in their endeavors to place the art of medicine upon a thoroughly scientific basis. A mere glance at the mass of facts embodied in the address should be sufficient to carry conviction to the minds of those inclined to doubt whether such a restriction would leave sufficient scope for the energies of active pharmacists, and it must be noted too that the restriction is but partial, being on one side only. Before the prescribed tasks can be performed efficiently, there is a very wide field of knowledge to be covered and a careful and prolonged training to be undergone.

Pharmacy as a Profession—Some Thoughts on.—S. P. Sadtler, in a valedictory address, says: "If the pharmacist is known to his neighbors and to the medical profession with whom he comes in contact, as a good chemical analyst, a thorough botanist and pharmacognosist, and, above all, a skilled compounder of all classes of official pharmaceutical preparations, he can rest assured that he will succeed, if he has, in addition, good common sense. Of course, all of these educational qualifications referred to may be thrown away on a visionary, rash and unpractical person." He then considers some of the means by which the standard of the profession may be advanced, and some of the drawbacks to which he referred may be removed. This will be secured by a better foundation to build professional study upon, and still more effectively by establishing graded courses, and lengthening the course of study to three and four years.—Amer. Jour. Pharm., 1894, 227.

Compulsory Pharmaceutical Education in America.—O. Oldberg, (Apothecary, Sept., 1893, p. 1 and 170) opens his article with the statement that the Seventh International Pharmaceutical Congress voted unanimously that compulsory pharmaceutical education is necessary in all countries ; and indulges the hope that a substantial measure in this direction may receive a support sufficient to be carried through our legislatures. While all other civilized countries have pharmacy laws, our own laws are nearly valueless, because they are crude and inconsistent. Legislation should require a certain degree of pharmaceutical training of all persons desiring to practice pharmacy, to protect the public against ignorance. The vast number of drug stores in this country has called into existence a close commercial competition, and unfortunately, compelled many pharmacists to deal also in sundries, the sale of which is, in but too many instances, a very desirable, because helpful, addition to earn a livelihood ; but while the public does not regulate the sale of those sundries, it is perfectly right in restricting the preparation and sale of such articles as affect its well-being, and even its life. The author thinks that it would be impracticable to place all the persons engaged in the drug business on the same footing—as a pharmacist supplying thousands in large cities, and doing the work of experts, must of necessity, have attainments superior to those of a druggist dispensing for comparatively few people living in sparsely populated country-districts. He, therefore, favors establishing two classes of drug-stores—one where any medicines can be prepared and dispensed, and the other where complex medicines are only sold. It is a deplorable fact that, in this country, the pharmacy laws do not prevent young men from entering a drug-store to learn pharmacy, even if they have no preliminary education at all. In conclusion, the author emphasizes the necessity of a complete and proper system of registering every person engaged in pharmaceutical work or in learning to do such work, for the effectual enforcement of compulsory preliminary education and apprenticeship. He is of the opinion, that the period of apprenticeship should count only from the date upon which applicants produce, before the State Board of Pharmacy, satisfactory evidence of their qualification.

Compulsory Pharmaceutical Education in America.—O. Oldberg considers the question in pharmaceutical education: That "a sufficient education" stands for much more in the development of a man than his age according to the calendar. That the requirements should be extended. There is no uniformity in the conferring of degrees and the amount of instruction required and given. The author believes that the student at college should devote himself entirely to his studies and drop his commercial pursuits.—Apothecary, Nov., 1893, 49, 80.

Conditions Favoring Good Pharmaceutical Education.—Ibid., 68.

The Dispensing Laboratory is considered one of the most necessary features in a school of pharmacy.—Ibid., 74.

Two Kinds of Pharmaceutical Schools.—Ibid., 114.

Proportion of Pharmaceutical Graduates to Students.—Ibid., 116. It seems that out of at least 100,000 drug clerks and apprentices only 3,500 or 4,000 undertake to acquire a systematic education in pharmacy, and that out of that number only about one-fourth finish the courses upon which they enter.

Practical Experience in Pharmacy.—Requirements by the colleges of pharmacy.—Ibid., 117.

The Training of the Shop.—Wm. B. Thompson endeavors to defend the possibility of the acquirement of an adequate pharmaceutical education in the shops.—Amer. Drug. and Pharm. Record, 1893, 276.

——— Reply to the above by Oscar Oldberg.—Ibid., 349; Apothecary, 1894, 119.

——— Article by S. W. Williams upon the same.—Ibid., 1894, 2.

American Pharmaceutical Schools.—An account of the schools, their faculties and requirements in 1893–94.—Apothecary, 1894, 145.

Theory versus Practice.—H. B. Mason (Bull. Pharm., 1894, 255). A good, thorough training in the store, preceded by a substantial preliminary education—a high-school course, at least—and followed by a reasonable season of theoretical study interspersed with practical experiment, cannot fail properly to qualify the earnest student, who cares to learn and has a just regard for his chosen calling, to become in time a pharmacist of ability, capable of fulfilling his duties to the credit of his profession.

Practical Training in Pharmacy.—Shop training begets a self-confidence in meeting emergencies that no college practice alone can possibly give; and self-confidence, based on proper knowledge, means not a little in the successful practice of pharmacy. There is another advantage, and that is, that the apprentice brought daily in contact with a practical work-a-day life comes to look upon the duties of his profession from a practical standpoint, so that when he goes to college he does not place an undue value upon theories, but seeks to differentiate between matters of purely theoretical value and matters of practical value, giving to each a proper place in his studies.—Alumni Report, 1894, 82.

Practical Training in Pharmacy.—Views of physicians in Alumni Report (Philada.), 1894, 82. If it be true that shop-training pharmacy is of such value to medical men, how much more must it be of value to students of pharmacy ?

Pharmaceutical Training—As it is and as it should be.—H. A. D. Jewett gives his ideas of what a typical pharmacist should be, and the course of training required to make such an one.—Pharm. Jour. Trans., 1894, 555.

Theses as a Requirement for Graduation from Colleges of Pharmacy.—Editorial in New Eng. Drug., 1893, 279. We cannot safely abolish the requirement of theses as an essential for graduation from our colleges of pharmacy.

Catalogue of Pharmaceutical Theses.—Name of thesis with author in École supérieure de pharmacie de Paris, de Montpelier et de Faculté de médecine et de pharmacie de Lyon.—Jour. Pharm. Chim., 1893, 137; 1894, 320.

The Desirability of College Instruction.—John M. Francis. The elevation and conservation of American Pharmacy depend upon its schools.—Bull. Pharm., 1894, 102.

What a College of Pharmacy does for a Drug Clerk.—A. H. Brundage says that a wise drug clerk turns to a college of pharmacy as a means to secure all of the desirable end.—Read before Kings Co. Pharm. Soc., April, 1894. Reprinted in nearly all of the American Pharm. Journals.

Practical Suggestions to the Student.—In Amer. Drug. and Pharm. Rec., 1893, 51 and 108, are to be found suggestions for the student and a synoptical list of colleges of pharmacy with general information regarding them.

Opportunities for the Clerk.—Suggestions for research by a writer in Amer. Drug. and Pharm. Rec., 1893, 276.

Preliminary Education.—Editorial, being a plea for a higher standard of preliminary requirements.—Pharm. Era, 1894, 99.

Preparatory Studies for Apprentices.—E. Speidel, in Drug. Circ., 1893, 149.

Pharmacist—The Position of the.—Merveille, in Gaz. Med. de Liège, through Rep. de Pharm.; Pharm. Jour. Trans., 1893, 265.

Pharmacy—Study and Progress in.—L. Lauder Brunton. Inaugural address delivered at the opening of the 52nd session of the Pharm. Soc. School of Pharm.—Pharm. Jour. Trans., 1893, 281.

Pharmaceutical Education in Nottingham.—F. Clowes.—Pharm. Jour. Trans., 1893, 171.

Pharmaceutical Education in Great Britain.—Ibid., 226, 229.

Development History of the Pharmaceutical University Institutes.—A. Tschirch. in Pharm. Post, 1894, 117, etc.

Pharmaceutical Society of Japan.—Pharm. Jour. Trans., 1893, 362.

Educational Information for the United Kingdom.—A summary of the legal conditions for the practice of pharmacy, medicine, dentistry and veterinary surgery, with particulars of practical knowledge, education and examinations required therein. Also statements regarding education and examinations in science, scholarship and honors in pharmacy.—Chem. and Drug., 1894, 419.

The Jacob Bell Scholarship.—Comments on the value and requirements in securing it, by a Bell scholar.—Chem. and Drug., 1894, 513.

Pharmaceutical Education in the Provinces.—C. O. Morrison, in Pharm. Jour. Trans., 1894, 694. The problem of pharmaceutical education, so far as Sheffield is concerned, is one of finance.

Notes on American Pharmacy.—N. H. Martin reviews the condition of pharmacy as seen by him during the brief visit to the United States. It is more in the nature of criticism.—Pharm. Jour. Trans., 1893, 481. Reprinted in West. Drug., 1894, 46; Drug. Circ., 1894, 113; Pharm. Era, 1894, 53.

——— Reply by C. S. N. Hallberg in article entitled "American Pharmacy Measured by the English Yard."—West. Drug., 1894, 44.

——— Reply by F. M. Goodman.—Pharm. Era, 1894, 202.

——— Editorial in New Eng. Drug., 1894, 114.

——— Editorial in Alumni Report, (Philada.), 1894, 62.

——— Editorial in Pharm. Rund., 1894, 25.

American Colleges of Pharmacy.—Article on Chicago College of Pharmacy.—Massachusetts College of Pharmacy.—Ibid., 308.—West Drug., 1893, 268.

Aspect of American Pharmacy.—Editorial in Chem. and Drug., 1893, 115, 154. After reviewing the principal causes in the retardation of progress in American Pharmacy the writer says that what appears to be necessary before American pharmacy can take its rightful position is that—

(1) An examination in English, arithmetic, and Latin, or French, or German, should be instituted and passed by candidates before commencing apprenticeship.

(2) Evidence should be produced to show that candidates for a license have been engaged for four years in dispensing and making pharmacopœial preparations, one year at a college of pharmacy being recognized as part of the period.

(3) The Boards of Pharmacy should be reconstituted so as to free them from executive functions, and devote themselves solely to the examination

of candidates. With this object only men of distinguished collegiate career who are known to be up to date in all the branches of knowledge pertaining to pharmacy should be appointed, and the honorarium should be such that the best men can afford to give their services.

Mission of Pharmaceutical Schools.—F. B. Power (Pharm. Rund., 1893, 258). "The greatest need of pharmacy to-day, as of other professions, is *men*, and by this I mean not only intelligent and educated men, of whom we have a good proportion, but those who have sound and just convictions, which they are *fearless to express*, and are willing to openly confront the evils which tend to nullify the best educational efforts, or even undermine the very foundations upon which all hopes of progress may rest." The author then refers to the evils of short courses of instruction, the use of "Quiz compends," etc., the discouraging condition of pharmaceutical literature. He believes in proper preliminary education, and when this is supplemented by sound and thorough scientific training, that pharmacy can be expected to take its rightful place among the professions.

PHARMACOPŒIAS.

U. S. Pharmacopœia of 1890.—Criticism upon, by G. M. Beringer, in Amer. Jour. Pharm., 1893, 466, 513, 596; 1894, 10, 92. This is without doubt the most critical review that this work has received.

U. S. Pharmacopœia—Views upon the.—Marc Boymond, assoc. editor of Rép. de Pharm.—Amer. Drug. and Pharm. Rec., 1894, 238.

——— Dr. Chas. Rice expresses his views in Ibid., 1894, 288.

——— On the chemical nomenclature, by J. Attfeld.—Ibid.

——— Wm. Mair, a Scotch reviewer.—Ibid.

——— V. Coblentz writes that Latin is the universal language of scientific nomenclature.—Ibid.

——— A. B. Taylor, that it is simply an extension of a long continued and well established precedent.—Ibid.

——— R. G. Eccles: the English is a synonym for, and not a translation of the Latin.—Ibid.

——— C. S. N. Hallberg says that like similar attempts to construct specific language for established sciences, it must be a constant compromise between a definite terminology and such changes as the practical application or acceptation of its development may admit of.—Ibid.

——— S. P. Sadtler claims it to be an improvement.—Ibid.

——— L. E. Sayre writes that the revisers probably did not intend it to be a literal translation, but rather a proper synonym.—Ibid.

——— O. Oldberg, in Apothecary, 1894, 127.

——— Weights of.—A. Shryock, in Amer, Jour. Pharm., 1893, 594.

U. S. Pharmacopœia.—Remarks upon.—Pharm. Jour. Trans., 1893, 201, 221, 241.

——— Editorial in Amer. Drug. and Pharm. Rec., 1893, 97, 236.

——— Editorial in Bull. Pharm., 1893, 387.

——— J. B. Nagelvoort.—Ibid., 1894, 203.

——— Classified list of substances contained therein. O. Oldberg.—Apothecary, 1893, 97.

——— Editorial in Pharm. Rund., 1893, 199.

——— Review by Bruno Hirsch.—Ibid., 1893, 208, etc.

——— Review by C. S. N. Hallberg, in West. Drug., 1893, 348, 388, 428, 471; 1894, 2, 86, 127.

——— Review by C. E. Clark in Pharm. Era, 1893, 542.

——— Editorial Chem. and Drug., July, 1893, 16, 394.

——— *Essential Oils of.*—Ibid., 157.

——— *Some Galenical Preparations.*—Notes on acidum hypophosphorosum dilutum, caffeinæ citras effervescens, glyceritum boroglycerini and lithii citras effervescens.—G. Lunan, in ibid., 1894, 310.

——— The New Revision.—J. W. England in Alumni Report (Philada), 1893, 24.

——— Editorial.—Notes on New Revision, 1893, 44, 53, etc.

——— *Pepsin in the.*—Ibid., 59.

Preparations of the Pharmacopœia.—W. P. De Forest refers to the changes.—Drug. Circ., 1894, 78.

U. S. and British Pharmacopœial Assay Compared and other Notes.—G. Coull.—Ibid, 310.

The Organic Materia Medica of the U. S. P.—G. Suttie, in Drug. Bull., 1893, 496. A tabulated list of changes in the botanical nomenclature.

Salol and Adeps Lanæ in the U. S. P.—Salol was admitted under a misapprehension. This was not the case with wool-fat.—C. Rice and R. G. Eccles, in Amer. Drug. and Pharm. Rec., 1894, 340.

Comparative Observations on some British and United States Pharmacopœial Preparations.—E. W. Lucas compares the more important articles that have been included in the new United States Pharmacopœia with the corresponding ones that have been official in the British Pharmacopœia for a considerable time—as, aloes, balsam of tolu, buchu, catechu and scammony, poppy capsules, digitalis, plasters, extracts, extracts of nux vomica and opium, extractum belæ liquidum, ext. cinchonæ liquidum, liquorice root (dried), Rhamnus frangula, glycerin of starch, guaiacum resin, infusions, rhubarb, sodium arseniate, syr. phosphate of iron, tinct. quininæ ammoniata, effervescing preparations, mucilages and injections, pills, ointments, filtration methods, assay processes, effervescing preparations, pepsin, cocaine hydrochlorate, elixir of orange, extracts of cimcifuga, jalap and cascara, citrate of iron and quinine, glycerites of carbolic and tannic acids, glycerite of boroglycerin, oleate of zinc, spirit of glonoin, tinct. strophanthus, hydrarg. cum creta, opium, cinchona bark, paraffins, compound liquorice powder, spirit of nitrous ether, syrup.—Pharm. Jour. Trans., 1894, 665.

U. S. Pharmacopœia—Classification of Oils and Oleoresins.—A. N. Doerschuk, in Meyer Bros. Drug., 1894, 68.

British Pharmacopœia Report for 1893.—From the report of Prof. Attfield on the progress of Pharmacy in its relation to the revision of the British Pharmacopœia.—Pharm. Jour. Trans., 1894, 1014.

Imperial British Pharmacopœia.—Prof. Attfield gives an account of the progress which has been made towards the proposed adaptation of the National Pharmacopœia to the requirements of India and the Colonies. —Pharm. Jour. Trans., 1894, 661; also Amer. Drug. and Pharm. Rec., 1894, 141.

Work of the Pharmacopœia Commission.—Investigations on potassium nitrate, sulphuric acid, saccharated iron carbonate, iron citrate, iron lactate, quinine sulphate, saccharated iron oxide, iron powder and method of assay.—Apoth. Zeit., 1893, 307, 324, 337; Chem. Zeit. (Rep.), 1894, 199.

——— Tests for reduced iron, cocaine hydrochloride, oils of anise, cumin, cloves and cinnamon.—Apoth. Zeit., 349, 360.

——— Tests for purity for basic salicylate of bismuth, alum; properties and description of amylene hydrate, homatropine hydrobromide; tests for purity of mercuric oxide, yellow mercuric oxide and physostigmine salicylate.—Ibid., 418, 424.

——— Tests for sublimed benzoic acid, carbolic acid liquef., camphoric acid, citric acid, hydrobromic acid, rectified pyroligneous acid, tannic acid, bismuth subsalicylate, balsam copaiba, crude cresol, saccharated carbonate of iron, lithium salicylate.—Ibid., 1893, 616.

——— Tests and improvements for citrate of iron, saccharated oxide of iron, reduced iron, glycerin, Fowler's solution.—Ibid., 1893, 618.

——— Descriptions and tests for amyl nitrite, borax, lead carbonate, solution of chloride of iron, lead oxide, lithium carbonate, morphine hydrochloride, sodium acetate, sodium bicarbonate, sodium bromide, sodium carbonate, sodium iodide, sodium nitrate, sodium phosphate, salicylate and thiosulphate, paraffin, ceresin and santonin.—Ibid., 1894, 175, 186, 196, 205.

Critical Examination of the Following Preparations.—Sulphuric acid (C. P.), chlorine water, crocus, sugar of milk.—W. Kinzel, in Ber. d. Pharm. Ges., 1894, 55; Chem. Zeit. (Rep.), 1894, 96.

International Pharmacopœia.—Editorials in Chem. and Drug., 1893, 571.

The International Pharmaceutical Congress.—Editorial defining its work and giving the resolutions adopted at the last Congress held in Chicago, Aug., 1893.—Apothecary, 1893, 32.

Farmacopea romana.—Review by J. Bogdan, in Pharm. Post, 1894, 81; also by Champigny.—Rép. de Pharm., 1894, 195.

Sanscrit Pharmacopœia—Leaves from a.—T. Stephenson publishes information upon oils, pills, powders, ointments. and various cures, from a very ancient Sanscrit manuscript.—Pharm. Jour. Trans., 1893, 161.

Swiss Pharmacopœia.—Review by E. Bourquelot, in Jour. Pharm. Chim., 1894, 297, 372, etc.

The New Swiss Pharmacopœie.—Review by Charles Rice.—Pharm. Rund., 1894, 63, 82; also by Otto Appel, in Pharm. Post, 1894, 21.

PERIODICALS.

Chemical, Pharmaceutical and Botanical Journals of North America.—Fr. Hoffman gives an account of the history of the publications, with names of editors.—Pharm. Rund., 1894, 131.

German Pharmaceutical Periodicals.—A statement of title, incorporation and editors up to 1894.—Pharm. Rund., 1894, 7.

NOMENCLATURE.

Nomenclature of Medicinal Substances.—A. Magee proposes for all alkaloids and other substances containing nitrogen, the ending "*inum*," as chininum, morphinum, pepsinum, pancreatinum. The others without nitrogen, ending in *in* to end "*ina*," as glycerina, vaselina, arbutina.—Apoth. Zeit., 1894, 301; Chem. Zeit. (Rep.), 1894, 105.

Pharmaceutical Etymology.—Being selections from a new part of the Philological Society's new English Dictionary, edited by J. A. H. Murray, covering words from "consignificant," to "crouching."—Chem. and Drug., 1893, 50.

Preparation—What is the Pharmaceutical Meaning of the Term?—Editorial in Pharm. Jour. Trans., 1894, 625.

Creosote or Creasote?—Charles Rice regards the form "creosote," as most in harmony with Greek usage. The spelling "creasote" appears now only in the British Pharmacopœia and in various unofficial works of reference, price lists, etc. All other pharmacopœias spell the word with "o."—Amer. Jour. Pharm., 1894, 166.

Pharmacopœial Nomenclatures.—E. Biltz, before International Pharm. Conference at Chicago.—Pharm. Rund., 1893, 212: Amer. Jour. Pharm., 1894, 26.

WORLD'S COLUMBIAN EXPOSITION.

World's Columbian Exposition.—Notes relating to the Exposition of 1892, held in Chicago, in the following: Chem. and Drug., 1893; Amer. Drug. and Pharm. Rec., 1893; West. Drug., 1893; Pharm. Era, 1893; The Registered Pharm., 1893; Pharm. Rund., 1893; Chem. Zeit., 1893. Special number by West. Drug.

PHARMACY AND MEDICINE.

Medicine and Pharmacy.—J. M. Good discusses the question "Shall the practice of medicine and of pharmacy continue distinct and separate?"—Amer. Med. Assoc.; reprinted.—Pharm. Era, 1894, 299.

The Chemist the Legitimate Dispenser.—J. Cocks, in Pharm. Jour. Trans., 1894, 594.

The Physician and the Pharmacist.—L. Ch. Boisliniere.—A paper read before the American Medical Association.—Drug. Circ., 1894, 52.

Why Physicians Dispense their own Medicine.—F. Fox claims that he is forced to dispense his own medicines in self-defence.—Bull. Pharm., 1893, 540.

——— C. S. Shaw claims that this is due to wrapping of prescribed medicines in patent medicine circulars. Unwarranted refilling of physicians' prescriptions. Counter-prescribing. Substitution. Carelessness.—Ibid., 1894, 12.

——— S. Parmer considers it due to lack of unity or malpractice in Pharmacy.—Ibid., 58.

Malpractice as Defined by Law.—Extracts from an address by Hon. David McAdams, delivered before the Society of Medical Jurisprudence at the Academy of Medicine.—Alumni Jour., 1894, 13.

REGISTRATION AND LEGISLATION.

The Respective Functions of State Boards and Colleges of Pharmacy.—O. Oldberg (Apothecary, 1893, 181). State Boards must introduce and maintain a thorough system of registration of all persons employed in the drug stores as proprietors, managers, clerks or apprentices, and must have an office in which their records are kept and sufficient funds to defray the unavoidable expenses of clerical work, stationery, correspondence, and facilities for holding proper examinations.

Reciprocal Registration.—H. R. Slack addressed letters to the secretary of every State Board in the United States, and received answers from thirty-four, leaving only two, Utah and California, to hear from. Nineteen favor reciprocity, ten oppose, four oppose on present plan, and Ohio is divided with a majority favorable. Fourteen have already accepted the plan suggested by the secretaries at their meeting in New Orleans.—Amer. Drug. and Pharm. Rec., 1894, 181.

The Interchange of Certificates.—W. H. T. Cummings.—New Eng. Drug., 1894, 133.

The True Intent of Pharmacy Laws.—S. P. Whitmarsh replies to Bowker.—Pharm. Era, 1893, 293.

The Benefit of Pharmacy Laws to Pharmacists and the Community.—Editorial, New Eng. Drug., 1893, 5.

Ethical Code for Pharmacists—A Suggested.—E. H. Gane proposes an ethical code for the professional side of pharmacy.—Pharm. Jour. Trans., 1894, 635.

Pharmaceutical Legislation in France.—Editorial on the French Pharmacy Bill which has just passed the Chamber of Deputies.—Chem. and Drug., July, 1893, 152.

Boards of Pharmacy.—List of officers in West. Drug., 1893–1894. Also found in other Pharm. Journals from time to time.

Missouri State Poison Law.—Discussion by A. N. Doerschuk on the existing deficiencies of the present poison law.—Nat. Drug., 1894, 151.

Poisonings in 1892.—Editorial Review in Chem. and Drug., 1894, 769.

Poisoning—Notes and Comments on.—Pharm. Jour. Trans., 1894, 564, 566, 587, 626, 641.

Poisons—Regulation of the Sale of.—From the report of the Parliamentary Bills Committee of the British Medical Association.—Pharm. Jour. Trans., 1893, 164.

——— *Unlawful Sale of.*—Ibid., 165.

Poisoning—Records of Cases of all Kinds of.—Pharm. Jour. Trans., 1893–94; Chem. and Drug., 1893–94.

A Cutter Sent to Prison.—A cutting pharmacist at Bordeaux, who had adopted the plan of adulterating medicaments in order to be able to lower his prices proportionally, was prosecuted by the Bordeaux Syndicate of Pharmacists, in the person of their President, M. Loisy, and has been sentenced to two years' imprisonment for fraud. An expert proved that of twelve medicaments purchased at the cutting pharmacy, only one—iodide of potassium—answered the required tests; even in this case the drug was more or less damaged; the others were all greatly adulterated. As a defense the incriminated pharmacist endeavored to prove that the sales in question had been made through the errors of assistants; but he was held responsible. It appears that he had attracted attention in Bordeaux as an advertising pharmacist.—Chemist and Druggist; Bull. of Pharm., 1894, 180.

MISCELLANEOUS.

John King—The Founder of American Materia Medica, the Father of Eclecticism.—Biography by J. U. Lloyd.—West. Drug., 1893, 492.

Relation of Pharmacists to Society.—C. S. N. Hallberg. Address to graduating class.—West. Drug., 1894, 167.

The Incomplete Pharmacist.—W. MacEwan in a facetious paper notes some of the weak spots in the pharmaceutical armor and sketches the genesis of the modern chemist's assistant.—Chem. and Drug., July, 1893, 150.

Sale of Intoxicants.—Editorial condemning the sale of alcoholic stimulants by pharmacists for other than medicinal purposes. Amer. Drug. and Pharm. Rec., 1893, 35.

The Position of the Pharmacist.—Dr. Merveille in Gaz. d. Liege, 1893; Pharm. Era, 1893, 446.

The Vagaries of Modern Pharmacy.—Extract from an address by J. R. Stokvis at the Eleventh Inter. Med. Con.—Amer. Drug. and Pharm. Rec., 1894, 278.

The Decline in the Patent Medicine Business.—The Chem. and Drug., (July, 1893, 481), calls attention to the fact that £20,000 less of medicine stamps were sold last year.

Ordo Rerum.—Rules to govern the employees of a pharmacy.—T. J. Keenan, in Amer. Drug. and Pharm. Rec., 1894, 344.

How to Manage a Retail Drug Store.—E. P. Southwick.—Amer. Drug. and Pharm. Rec., 1893, 100.

Commercial Side of Pharmacy—Changing Conditions of the.—From an address by H. H. Rusby.—Drug., Circ., 1894.

Pharmaceutical and Medicinal Curiosities.—H. Lafite, in Pharm. Post, 1894, 1 (Illustrated). See, also, Ibid., 16.

Le Jardin des Apothècaires de Paris.—G. Planchon writes an interesting historical account of what he considers the most remarkable botanical gardens in France.—Jour. Pharm. Chim., 1893, 250, etc.

The Value of Drugs in the Last Century.—E. M. Holmes quotes from a book without a title page, and issued at the East India Coffee House, Leadenhall street, by W. B. E., apparently about the year 1770.—Drug. Bull., 1894, 206.

Pharmacists in the U. S. Navy.—G. F. Payne shows the socially degraded position of the pharmacist in the U. S. Navy.—Merck's Mark. Rep., 1894, 100.

Women in Pharmacy.—G. E. Dyck, in Meyer Bros. Drug., 1893, 207.

——— Ibid., 1894, 45.

——— Expressions from various sources in Meyer Bros. Drug., 1893 and 1894.

——— G. E. Dyck, in Registered Pharm., 1893, 275; from Med. Review.

——— R. Grüner in Zeitsch. Oest., Apoth.-Ver., 1893, 704.

GENERAL FORMULAS.

An Alloy which Adheres to Glass.—M. F. Walter has found that an alloy, consisting of 95 parts of tin and 5 parts of copper, adheres so tenaciously to glass that it may be employed as a solder to join the ends of glass tubes. It is obtained by adding the copper to the tin previously melted, agitating with a wooden stirrer, casting or granulating, and then remelting. It melts at about 360° C. By adding ½–1 per cent. of lead or zinc, the alloy may be rendered either softer or harder, or more or less easily fusible. It may also be used for silvering metals or metallic thread.—Scient. Amer., 1894, 198.

Aluminum Solder.—Lançon, of Biel, has obtained a patent in Switzerland for the preparation of a number of aluminum solders (Ztsch. f. Instr.-kunde). For *wires* and *thin* articles the solder consists of 95 parts of aluminum, 1 part of copper and 4 parts of tin; the last-mentioned may be replaced by 2 parts of bismuth, 1 part of zinc, and 1 of tin. For larger aluminum sheets and other aluminum articles, it is composed of 95 parts of aluminum, 2 of copper, 1 part of antimony, 1 of bismuth, and 1 of zinc; or of 60 parts of aluminum, 13 of copper, 10 of bismuth, 15 of antimony and 2 of tin. The solder is prepared as follows: The pure aluminum is fused, the surface of the fused metal is fully covered with a layer of phosphoric acid, acid sodium phosphate, some fluoride or other salts of an acid reaction; the other metals are then added.

To Keep Ants Away—Use of Balsam of Peru.—Amer. Drug. and Pharm. Rec., 1893, 228; from Scientific Amer., 1893.

To Remove Odors from Alembics.—To remove from alembics and stills the odors of essential oils, aromatic waters, etc., ammonium carbonate is highly commended. Add a few ounces of it to the water used for cleaning, and let the solution remain in contact from a half to three-quarters of an hour.—Nat. Drug., 1893, 139.

Removing Aniline Stains from the skin by acids or hypochlorites, is frequently impracticable, owing to its ill consequences. Unna therefore proposes (Pharm. Ztg., 1894, 33) to wash the hands first with a 5 per cent. sodium-chloride solution, then with a 5 per cent. solution of hydrogen peroxide, and to rub them with linen dipped in alcohol.

Colored Fires.—Formulas for, in Amer. Drug. and Pharm. Rec., 1894, 312.

The Fly-paper Trade in Germany.—The annual official announcement has been again made which restricts the sale of arsenical fly-papers to the qualified pharmacists and to those traders licensed to deal in posions. Even these have to register such sales.—Chem. and Drug., 1893, 6.

To Render Gums, etc., Soluble.—Difficultly soluble gums, according to Köchlin, are rendered easily soluble by heating them for two or three hours to 100° C., along with peroxide of hydrogen. Köchlin's formula is 10 parts of the gum, 50 parts of water, and 3 parts of a 12 per cent. solution of hydrogen peroxide.—Nat. Drug., 1894, 176.

Glue not Affected by Moisture.—Preparation: Water is poured over ordinary good glue, which is then allowed to stand for a while, but not long enough to become gelatinous. Linseed oil is poured over the mass, which is heated over a slow fire until completely dissolved, when it is ready for use. This glue becomes exceedingly hard after drying.—Drug. Circ., 1893, 132.

To Increase Adhesiveness and Diminish Brittleness of Mucilage.—Add a solution of aluminum sulphate. Formula (Nat. Drug., 1893, 111): Gum arabic, 80 parts; water, 160 parts; dissolve and add 2 parts of crystallized aluminum sulphate, dissolved in 20 parts of water, and mix thoroughly. A solution of alum will serve the same purpose, but far less effectually.

Mucilage of Myrrh.—After tincture of myrrh has been filtered, the residue is treated with a few more separate portions of alcohol, or until it passes through nearly colorless; these portions are then mixed and reserved for making the next respective tincture. The dregs or gum in the filter is transferred to a suitable bottle, having a capacity of about three times that of the weight of dregs; water sufficient, or about twice the weight of dregs, is then added, allowed to macerate, and when convenient is strained. This mucilage is of a dark-brown color, has a very agreeable odor, and answers its technical use very well.—Pharm. Centralh., 1893, 556.

To Fasten Leather to Iron or Steel.—Cover a good article of carpenter's glue with cold water over night, and put in a cool place. In the morning pour off the water, getting rid of the last possible drop by throwing the swollen glue on a towel or bibulous paper. Dissolve the swollen glue in a small quantity of strong vinegar or dilute acetic acid, and to the solution add one-third of its volume of oil of turpentine and stir well. Prepare the iron or steel by covering it with a paste made of dry white lead or lampblack, stirred up in warm water. Let dry, and as soon as dry cover it with the glue mixture while still warm, and apply the leather at once. Press closely to place, and if convenient weigh the leather so as to keep it smooth and in close contact. In the course of a few hours it will be so firmly attached to the surface that it can with difficulty be removed.—Nat. Drug., 1894, 149.

Solution for Charging Fire Extinguishers.—Hunkel (Ibid., 27) makes the following solutions in separate vessels: (1) 2 parts of ammonium chloride in 200 parts of water; (2) 3½ parts of burnt alum in 100 parts of water; (3) 30 parts of ammonium sulphate in 50 parts of water; (4) 20 parts of cooking salt in 400 parts of water; (5) 3½ parts of sodium carbonate in 50 parts of water; (6) 45 parts of water glass. Now mix these solutions in the order named, and while the mixture is still turbid and yellow add 200 parts of water. Let stand, and when the precipitate has subsided decant the clear liquid and fill into hand-grenades or bottles of thin glass.

Fire Proofing Clothing.—The official description is as follows: Take 40 Gm. boric acid, 30 Gm. aluminum sulphate, 17 Gm. tragacanth, and 9 Gm. silicate of potassium, and dissolve them in 450 Gm. of water at 90° C. Make another solution composed of 30 Gm. sodium nitrate, 7 Gm. ammonium borate, 17 Gm. ammonium phosphate, and 100 Gm. of water. Mix the two solutions, let stand until precipitation has subsided, and decant the clear liquid. The article to be fire-proofed is placed in this liquid and left for forty or forty-five minutes at a temperature of 35° C.—Ibid., 27.

To Destroy Kerosene Odor.—The odor of kerosene may be modified, if not entirely destroyed, by using the following formula: Mix chloride of lime with petroleum in the proportion of 3 oz. for each gallon of the liquid to be purified. It is then introduced into a cask; some muriatic acid is added, and the mixture is well agitated, so as to bring the whole of the liquid into intimate contact with the chlorine gas. Finally, the petroleum is passed into another vessel containing slaked lime, which absorbs the free chlorine and leaves the oil sufficiently deodorized and purified.—Scientific American; Chem. and Drug., 1893, 151.

Ink for Typewriter Ribbons.—Formulas for, in Amer. Drug. and Pharm. Record, 1893, 139.

Lithographer's Inks—Manufacture of.— A. M. Villin. The formulas from Bull. de la Soc. Chim. de Paris.—Amer. Drug and Pharm. Record, 1894, 34.

Ink Formulas.—Amer. Drug. and Pharm. Rec., 1894, 146.

Indelible Inks without Silver.—Nat. Drug., 1894, 113; from Brit. and Col. Drug.:

SOLUTION NO. 1.

Aniline hydrochlorate	20 parts.
Distilled water	30 "
Mucilage	20 "
Glycerin	10 "

Mix.

SOLUTION NO. 2.

Copper chloride	8½ parts.
Chlorate of sodium	10½ "
Sal ammoniac	5¼ "
Dissolve in water	240 "

Mix one part of No. 1 with one part of No. 2. A greenish liquid results, which rapidly becomes dark on heating. If objection is made to the green tint, add a little nigrosine or similar black dye to the solution No. 2.

Ancient Egyptian Pigments.—Lecture by W. J. Russel.—Printed.—Amer. Drug. and Pharm. Rec., 1894, 145.

Polishing Powders.—Composition in Nat. Drug., 1894, 174; from Centralh. f. Optische Mechanik.

Sachet Powders.—Formulas in Amer. Drug. and Pharm. Record, 1894, 208; Merck's Mark. Rep., 1893, 222.

Soap Formulæ.—In Amer. Drug. and Pharm. Rec., 1894, 88.

Talc and Other Toilet Powders.—Formulas in Drug. Circ., 1893, 153.

Talc—The Uses of.—West. Drug., 1894, 5; from Am. Soap Jour.

Eligible Toilet Articles.—Frank Edel gives formulæ for toilet powders, colognes, tooth powders, hair tonics.—Amer. Drug. and Pharm. Rec., 1893, 68.

Applications for Toothache.—Formulas from "Practical Dentistry."—Amer. Drug. and Pharm. Rec., 1893, 320.

Bronze Color to Brass.—A number of methods in Nat. Drug., 1894, 115.

To Gild Silver, Brass, etc., Without a Battery.—Martin's process, which is found in Neueste Erfindungen u. Erfahrungen, is as follows: Dissolve 20 parts of gold chloride, 60 parts of potassium cyanide, 5 parts potassium bitartrate (cream tartar), in 100 parts of water, and add 10 parts of precipitated chalk. After cleaning the article to be gilded most thoroughly, and especially after getting rid of all greasy matter, apply this mixture with a woolen rag and rub vigorously.—West. Drug., 1893, 182.

Coloring Brass.—According to O. Pfieffer, beautiful shades from light brown to black may be obtained by cleansing the brass article thoroughly, and immersing it in a solution of one part of copper nitrate and two parts of ammonia water. The depth of color will depend upon the length of time the article is immersed. By brushing the article over with wax or vaseline a polish is imparted. When colored, lighter tones may be produced by dipping in dilute acid.—Zeit. d. Ost. Apoth. Ver., 1893.

Varnish for Japanned Wares may be made by dissolving 40 Gm. of button lac and 40 Gm. of light rosin in 1 liter of strong alcohol, and allowing the solution to clear. The varnish and the article to which it is to be applied should both be warmed when used. Two coats should be applied, the first being thoroughly dried before the second is put on. When the coating is sufficiently thick it should be polished with tripoli or finest powdered pumice. For black Japan lac dissolve 20 Gm. of genuine asphalt in a little warmed boiled linseed oil, rub up 40 Gm. of burnt umber with another portion of oil, mix and dilute with sufficient boiled oil to make 1 liter, and then dilute this as may be required with oil of turpentine.—Amer. Drug. and Pharm. Rec., 1893, 338.

A New and Valuable Varnish or Paint Vehicle.—Under the name, "Alytoganoma," les Corps gras industrielles introduces a brilliant waterproof lac that can be used as a plain varnish for wood or metals, or can be employed as a vehicle for colors, and thus used as a paint for house fronts, etc. Our contemporary states that it dries very rapidly and becomes excessively hard. There are two grades of it, as follows: No. 1, Amber colophony, 1 part; purified benzin (0.710 s. g.), 14 parts; linseed oil varnish, 3 parts; turpentine, thickened, 1 part. mix. For No. 2, take 8 parts of amber colophony, 8 parts ordinary American rosin, 14 parts purified benzin (0.710 s. g.), 8 parts linseed oil varnish, 1 part thick turpentine. Melt the solid gums in the varnish, remove from the fire and let cool down to about 85° F. Add the turpentine, stir in, and, finally, add the benzin, and stir until a homogeneous fluid is obtained.—Nat. Drug., 1894, 149.

A Flexible Black Lacquer.—A flexible lacquer for articles of metal, or other substances not altogether rigid, is made as follows: Dissolve 100 parts of asphalt in 150 parts of benzol. In another vessel dissolve 6 parts gum elemi and 4 parts balsam copaiba in a small quantity of benzol, and mix the solutions. To the mixture add 5 parts of india-rubber dissolved in sufficient benzol, and thoroughly incorporate. The mixture first made, without the india-rubber solution, will answer for all articles that are not very flexible, but for leather, etc., the addition of the india-rubber is necessary.—Ibid., 115.

A Good Water-proof Paint for metal roofs as well as wooden structures exposed to dampness may be made as follows: Dissolve india-rubber in linseed oil, and produce the required consistency by the addition of graphite. Another formula is: Mix 4 parts powdered glass, 3 parts coal, 3 parts powdered brimstone, 3 parts tar, 3 parts pitch, and 1 part boiled linseed oil: melt together in an iron vessel at a moderate temperature. Lay on the wall and strew over with sand.—West. Drug., 1894, 18.

Varnishes for Negatives.—Formulas, see Nat. Drug., 1893, 136.

Remove Grease from Marble.—Apply whiting or fuller's earth saturated with benzine, and allow it to stand some time. Or apply a mixture of two parts sal soda, one part pumice stone and one part chalk; all first finely powdered and made into a paste with water; rub well over the marble and finally wash off with soap and water.—West. Drug., 1893, 364.

Wood Stains.—Abstract from Dieterich's Pharmaceutical Manual.—Amer. Drug. and Pharm. Record, 1894, 279.

Zinc Paste.—Formulæ.—Ibid., 247.

MEDICAL AND PHARMACEUTICAL.

Activity of Galenicals.—Dr. von Oefele, in an article, mentions a number of points of interest with reference to galenical preparations. He states that solutions containing organic and inorganic substances, such as various liquid galenicals, soon undergo decomposition, the organic principles splitting into new compounds, owing to the presence of the inorganic substances. When these latter are removed, as by dialysis, the preparation is permanent. An example is made of "ergotinum dialysatum Bombalon," which is deprived of inorganic substances, and in consequence maintains its virtues for years.—Aerztl. Rundschau, West. Drug., 1893, 321.

Artificial Air-Supply.—Lecture by J. Brady on possibilities of use of liquid air in submarine navigation and for hospitals.—Am. Therap., 1893, 160.

To Produce Agustia.—Gymnemic acid has the property when applied to the tongue, of producing agustia of sweet and bitter substances to such an extent that it becomes impossible to distinguish between sugar and quinine. The taste of acids, salts, and acrid substances remains undisturbed. The author suggests that before taking disagreeable medicines the mouth should be washed with a solution of the acid dissolved in a sufficient quantity of alcohol for the purpose, and diluted with water to the strength of 0.5 (½) %.—Therap. Review, Notes on New Rem., 1893, 63.

Dental Anæsthetics.—Analysis of proprietary secret local anæsthetics.—S. P. Sadtler.—Amer. Drug. and Pharm. Rec., 1893, 220.

Anæsthetic Mixture.—M. Latta, in the Chicago Med. Record, recommends an anæsthetic mixture which he has used for the past twenty years, consisting of one drachm of nitrite of amyl to a pound of chloroform. He claims for this mixture that it is particularly useful in cases of weak heart, and that it practically does away with the stage of excitement.—Notes on New Rem., 1893, 118.

Anæsthetics—Statistics of.—Chem. and Drug., 1893, 491.

The Anthelmintic Action of Ammonium Embelate, reported by Warden, is confirmed by G. Coronedi, of Florence (Aerztl. Cent. Anz.), who finds it to be one of the best vermifuges and anthelmintics, not alone in the case of ascarides, but tape-worms as well. The dose of ammonium embelate for an adult is 0.36 Gm., and for children, 0.28 Gm., administered in honey, The purgative should not follow its administration until after the lapse of several hours.—West. Drug., 1894, 22.

Anti-Emetic Action of Menthol.—R. Blondel states that, in small doses frequently repeated, it stimulates the sluggish muscular action of the stomach, that nausea and gastric spasm can be stopped at such a point that even ipecac loses its power of producing emesis. This property of menthol makes it of value in the treatment of dysentery by ipecac, when a fifth of a grain of menthol may be administered with each dose.—West. Drug., 182; from Nouv. Rem., 1893.

Antiseptic Dressings—Manufacture of.—Processes for making gauzes.—Pharm. Era, 1893, 103.

Tannin an Intestinal Antiseptic.—West. Drug., 1893, 182; American Therap., 1893.

Salicylic Acid in Bandages.—Barthe estimates the salicylic acid in bandages as follows: 4 Gm. of the material are treated with 100 Gm. of distilled water, to which some alcohol has been added, at a temperature of 50° C., for one hour. The liquid is then filtered through a funnel and the materials washed 5 or 6 times with warm water until the filtrate gives but a slight violet coloration with ferric chloride. It is then titrated with $\frac{n}{10}$ alkali, using phenolphthalein as an indicator. An easier and quicker method is to take 6 Gm. of the material and warm between 40–45° C. with 270 C.c. water and with 30 C.c. of $\frac{n}{10}$ alkali. Of this solution 200 C.c. are filtered off; 20 C.c. are treated with $\frac{n}{10}$ hydrochloric acid, with phenolphthalein as before. By multiplying the amount of $\frac{n}{10}$ alkali required by 0.0138 and multiplying this result by 25, the per cent. of salicylic acid in the material is obtained.—Apoth. Zeit., 1894, 170.

Proof of the Sterilization of Surgical Dressings is obtained, according to Manthner (Deutsche Med. Zeitung), by applying to the dressing a harmless color which will change when heated to 100° C. Such a color is furnished by the following preparation: Solution of ammonium acetate 150 parts; water, 150 parts; 20 per cent. alizarin paste, 5 parts. This mixture should be well skaken before being applied to the dressing. It is brown in color, but will turn to a bright red on being heated to 100° C.—West. Drug., 1893, 402.

The Parasite of Cancer.—Comparison of results by Adamkiewicz and Korotneff.—West. Drug., May, 1894; from Int. Jour. Surgery.

Chloroform Sickness.—Inhalation of vinegar is used with success.—West. Drug., 1894, 220; from Brit. Med. Jour.

Coloring Medicines.—Formulæ by F. von Oefele.—Pharm. Centralh., 1893, 683.

Castor Oil Mixtures.—H. Coupland (Chem. and Drug., 1893), recommends the use of almonds as an emulsifier, inasmuch as 1 part of the latter will emulsify 1 part of castor oil. The following formula is suggested:

Castor oil	2 fl. drs.
Sweet almonds	2 drams,
Syrup	1 fl. dr.
Water	enough to make 1 fl. oz.

The almonds should be beaten into a pulp, with a little water, afterwards adding more water to form a thin paste. The oil can then be added gradually, with constant trituration; afterward, water to the required volume. If necessary, a larger proportion of oil may be used. Tincture of senega is also considered a suitable substance, senegin being a very effectual emulsifier of oil. The mixture recommended is as follows:

Castor oil	½	fl. oz.
Senega tincture	1	fl. dr.
Water	enough to make 1	fl. oz.

Triturate the oil with the tincture, and add the water gradually, while stirring constantly. A comparatively thin mixture is said to be formed, so that more oil can be incorporated by it than by most other mixtures. The author is of the opinion that the mixture of almonds is preferable to that made with any other emulsifier. It is superior to that made with potassa, he says, because there is no chemical combination; to that prepared with the yolk of egg, because it will keep longer; and to the acacia and senega mixtures, because it is more palatable.

Administration of Castor Oil.—M. Patien advises the administration of castor oil in an emulsion of the following formula: Castor oil, 30 Gm.; syrup of almond, 30 Gm.; syrup of acacia, 30 Gm.; peppermint water, 10 Gm.; distilled water, 50 Gm. To the mixture of the two syrups the oil is added, then the two distilled waters, mixing intimately after each addition.—Petit Monit. de la Pharm., Oct., 1893, p. 1353; Amer. Jour. Pharm., 1894, 106.

——— A. E. Hiss, in Pharm. Era, 1894, 463:

Castor oil	2¾	fl. oz.
Egg yolk	½	fl. "
Syrup	¾	fl. "
Oil of cassia	20	drops.

The egg yolk should be thoroughly beaten in an emulsion mortar, the two oils incorporated gradually until emulsified, finally adding the syrup. The volatile oil and the syrup with the emulsificant completely disguise the taste and odor of the castor oil. Such an emulsion contains 70 per cent. of the oil. In addition to assisting to disguise the taste, the cassia oil serves the further purpose of preventing griping.

Aromatic Cod-liver Oil.—E. Dieterich gives in his new manual the following formula for aromatic cod-liver oil:

Cod-liver oil	1000	parts.
Lemon oil	5	"
Neroli oil No. 00	2	"
English peppermint oil	1	part.
Vanillin	$\frac{1}{10}$	"
Cumarin	$\frac{1}{100}$	"

The last two ingredients are dissolved in the ethereal oils with the aid of gentle heat, and the solution is admixed with the cod-liver oil.

Palatable Cod-liver Oil may be prepared, according to Standke, by allowing freshly-glowed granulated charcoal to remain for some length of time in contact with good oil, under the exclusion of air. Every trace of disagreeable odor and taste may thus be removed, it is stated; and cod-liver oil treated in this manner has a mild and agreeable taste, and is distinguished by its stability. Its palatability may further be increased by the addition of saccharin and cinnamon oil.—Deut. Med. Wochenschr., 1893.

Tasteless Cod-Liver Oil.—E. E. Fischer, in Amer. Drug. and Pharm. Rec., 1893.

Fl. Ext. Wild Cherry	2 fl. oz.
Fl. Ext. Liquorice	3 "
Glycerin Syrup } of each	1 "
Liq. Ext. Malt	6 "
Syrup of Hypophosphites	3 "
Gaduol	64 grains
Fuller's Earth	4 drams
Caramel	as desired.

Mix the gaduol with the glycerin, and triturate with the fuller's earth; add the fluid extracts, syrup and malt, shake well and let stand one day, occasionally shaking, filter, and to the filtrate add the syrup of hypophosphites, and mix well.

Wine of Cod Liver Oil.—Ibid.

Gaduol (Ext. Cod-liver Oil)	6 grains
Alcohol	4 fl. drs.
Syrup	2 fl. oz.
Fuller's Earth	4 drs.
Port Wine	enough to make 1 pint.

Mix the gaduol with the alcohol and add the fuller's earth; triturate well, and add the syrup and wine. Let stand a day or so, shaking occasionally, then filter, passing sufficient wine through the filter to preserve the volume.

——— Ibid. A preparation of the same character as the above, but of a more distinctive taste and appearance, may be compounded as follows:

Gaduol	64 grains.
Alcohol	4 fl. drs.
Fuller's earth	4 drams.
Port wine Claret wine }	equal parts to make 1 pint.

Proceed as before. Compounds prepared as above contain 25 per cent. of the active medicinal principles of the cod-liver oil.

Cod-Liver Oil with Saccharin.—Wiener Klin. Runds., 1893.

Saccharin	40 Cgm.
Acetic ether	2 Gm.
Cod-liver oil	100 Gm.
Peppermint or cinnamon oil	q. s.

Ferro-Iodized Cod-Liver Oil.—Ch. Diete (Chem. Zeit., 1893).

Porphyrized iron	20 parts.
Iodine	41 "
Ether	350 "

Mix and agitate until all the iron is converted into iodide. Then heat on a water-bath 1000 parts of cod-liver oil; add the ethereal solution of iron iodide, and continue the heat until the ether is driven off. Let cool and filter. Keep in small, dark, well-filled containers.

To Remove the Odor of Cod-Liver Oil.—Carlo Pavesi recommends the following process: Put into a glass matrass 1 part of purified ivory black and two parts of finely-ground roasted coffee to every 40 parts of the oil. Close the matrass with a cork, place it in a water-bath and heat for fifteen minutes, at a temperature of 50° to 60° C. Let cool slowly, leave in contact for three or four hours, and finally filter. Keep in well-corked bottles. The oil thus treated loses every particle of its disagreeable taste and odor.—Nat. Drug., 1893, 139.

To Remove Odors of Creosote, or Guaiacol, and Iodoform.—Wash with water in which ground flaxseed has been boiled and drained off. Objects smelling of iodoform should be washed in tar water to which has been added some essence of wintergreen. Rooms smelling of creosote or iodoform can be deodorized by burning coffee berries in them. Pills of creosote over which freshly ground coffee has been sprinkled lose their disagreeable odor.—West. Drug., 1893, 402.

Digestion Without Digestive Ferments—A. Dastre concludes from his experiments that recent albuminoid substances may undergo, without the explicit addition of digestive juices, a series of the same transformations as under the influence of the gastric juice. The condition of the phenomenon is a prolonged stay (of from some days to some weeks) of the albuminoid in the saline solution at the ordinary temperature. The action is more rapid and more complete at 40° C., and on exposure to strong light.—Compt. Rend., 1894, 959.

Drains and Disease.—An editorial on the existence of the morbific elements of many diseases as existing in the drains of all large towns.—Pharm. Jour. Trans., 1893, 529.

Salol and Camphor Emulsions.—M. Lerich, in Bull. Méd. de l'Alg.:

Salol Camphor Oil of sweet almonds	of each 2 parts.
Powdered acacia	3 parts.
Distilled water	60 parts.

Rub the salol and camphor in a mortar, and when well liquefied, add the almond oil and then the acacia. Pour on 6 parts of the water; beat thoroughly, and add the remainder of the liquid in small portions.

Eno's Fruit Salt is composed, according to Chem. Techn. Gewerbebl., of 108 parts sodium bicarbonate, 150 of tartaric acid, and 110 of Rochelle salt, and is therefore similar to seidlitz powder.—West. Drug., 1894, 326.

Glycerin Jelly for the Hands is prepared (Pharm. Ztg., 1894, 40) as follows: 8.5 Gm. of gelatin are soaked in 180 Gm. of rose-water, dissolved in the water-bath, and admixed, after cooling, and while the mass is still liquid, with 20 Gm. of albumen. On heating the mixture again, it becomes perfectly clear,—from the precipitation of the albumen. It is then admixed with a solution of 75 Cgm. of salicylic acid in 180 Gm. of glycerin. The liquid, well mixed and filtered through a hot-water funnel, is finally poured into wide-mouthed bottles, where it solidifies.

Calcium Chloride as a Hæmostatic.—A. E. Wright (Brit. Med. Jour., 1891, 306), publishes an interesting paper, in which he describes a simple method of testing the relative coagulability of the blood, by drawing it into capillary tubes and noting the time in which it clots in the tubes, so as not to be expelled by blowing; and further relates the results obtained by this method in a case of hæmophilia treated by calcium chloride. It was shown that the normal coagulation time was between four minutes and fifty seconds and five minutes,—its prolongation in hæmophilia being 12–14 minutes, which was reduced after the administration of 1 Gm. of calcium chloride three times a day to 5′ 15″ or 5′30″; but, unfortunately, his experiments were brought to an end by the departure of the patient. In the course of the last few months, Prof. R. Saundby (Birmingh. Med. Rev., 1893; No. 182) has used calcium chloride occasionally as a hæmostatic agent successfully.

Chloroform as a Hæmostatic.—A writer in the "Med. Press" recommends the use of chloroform as a general hæmostatic. Applied on lint or absorbent cotton to the bleeding surface, it promptly stays the flow, acts as a direct stimulant to the patient, and leaves no blood crust to fall off and recommence the bleeding.—Notes on New Rem., 1893, 35.

Iron as a Hæmostatic.—Cheever recommends ferric alum as a styptic, on account of its non-irritating properties. It coagulates the blood very quickly, and forms with the clot a sort of sand which is not irritating to the tissues, while persulphate and perchloride of iron form hard, brittle, angular clots.—Ibid.

In Hæmorrhages or Consumption.—Blaschko, in the Deutsche Medizin. Wochenschr., recommends the following:

Gallic acid	grs. xv.
Ergotin	grs. xv.
Distilled water	ʒ vj.
Syrup of marshmallow, q. s. ad	℥ jss.

M. Sig.—Teaspoonful every two hours.

If there is a desire to cough, the syrup of poppies should be used in place of marshmallow. Where death is imminent, the remedy should be used at intervals of one hour. The use of this preparation enables one to do away with the sacks of ice, subcutaneous injections of ergotin, etc. It is sure, and not unpleasant to take. The patient should be given in the meantime small pieces of ice to hold in the mouth, cold milk, etc., and should be ordered to maintain perfect rest in bed.—Nat. Drug., 1894, 46.

Danger of Morphine in Angina Pectoris.—Physicians are too apt to resort to hypodermic injections of morphine in the treatment of angina pectoris. While such injections relieve pain, they constitute a real and an imminent source of danger, especially when the angina takes on the asphyxic form, as has been pointed out by Huchard, in a memoir on the subject recently read before the Therapeutical Society of Paris. This author recommends repeated injections of caffëine, ether, and trinitrine (glonoin), under which he states that the pulse rapidly recovers, and the asphyxic phenomena and comatose tendencies disappear.—Nat. Drug., 1893, 6.

Chemical Classification of the Hypnotics.—Bardet (Jour. Pharm. Chem., 1894, 276) divides the hypnotic medicaments into 5 groups: 1st, the fat ethers; 2d, the derivates of aldehyde; 3d, the aromatics; 4th, the vegetable; and 5th, the mineral. The group of fat ethers comprises the chlorides, acetates, tartrates and valerianates of the monatomic radicals: methyl, ethyl, amyl, etc. These substances provoke, when administered in average doses, a sleep of short duration without anæsthesia; if the hypnotic dose be exceeded, anæsthesia will ensue just as with chloroform. Sulfonal combined with this group acts similarly to alcohol in toxic doses, but does not stimulate. The group of aldehyde derivates embraces: paraldehyde, which also acts like alcohol; methylal, which does not, like chloral, cause subsequent disturbances; chloral and its derivates, which are energetic hypnotics. Chloral irritates the digestive organs, leaves after the sleep a disagreeable heaviness, and sometimes provokes erythema. These inconveniences, especially the irritation of the digestive tract, disappear in part with the chloral derivates (chloralamide, chloralose, chloral-ammonium, hypnal or chloral-antipyrine, somnal or ethylchloral-methylene, ural or chloral-urethane, etc.). The author is convinced that the chloral compounds act exactly in direct proportion to the amount of chloral they contain. In the group of aromatics is hypnone, a useful medicament especially in excited persons. To the vegetable group belong boldo and piscidia, both rather treacherous hypnotics, it is held. The mineral group, finally, comprises the bromides, for the general treatment of nervous diseases.

De Baun's Insufflator.—A machine for obtaining artificial respiration. It has been devised for persons who have been brought apparently to death's door by asphyxiation from gas or water. In the latter case the lungs must first be emptied. The apparatus weighs but a few ounces. It is not patented.—Am. Therap., 1893, 160.

Pastilles for Preparing Sterilized Physiological Salt Solution for Subcutaneous Injection.—J. Schwalm prepares pastilles consisting of chemically pure sodium chloride, to which a small quantity of dextrin is added to facilitate its formation into pastilles; the perfect innocuousness of dextrin precludes any apprehension as regards its introduction into the blood. The sterilization of the finished pastilles is most conveniently done in a desiccator, at a temperature of about 130° C. for half an hour. This is to be preceded by a longer drying at 100° C., and it is advisable to sterilize also after drying in the sterilized glass tubes destined to contain the pastilles. In order not to render them unnecessarily large, the author selected a weight of 3 Gm. for each, so that two pastilles are required for preparing a litre of 0.6 per cent. solution, the physiological standard. Pastilles thus prepared dissolve in a few moments. Only water which has previously been boiled and again cooled down to the body temperature should be employed for the injections, which are said to be absorbed rapidly.—Pharm. Ztg., 1894, 126.

Subcutaneous Injection of Salt Solution, as a substitute for the intravenous injections, has been found efficacious by Farrar Cobb (Boston Med. and Surg. Jour., 1893, p. 325), in a number of cases of collapse.

Hypodermic Use of Magnesium Sulphate.—Wade (Rep. Maryland Hosp. for the Insane) has tested the purgative effect of this drug in small doses given hypodermically. The amount used varied from 1½ grains to 4½ grains. It was tried one hundred times in forty-six patients, and was successful in sixty-seven instances. In fifty-three it produced a single evacuation; in ten, produced two; and in four, three evacuations. In only two patients were the injections a constant failure. The indications for the use of this drug hypodermically would be, the existence of gastric inflammation; and in abdominal surgery, where, if given by the mouth, the purgative is apt to cause vomiting; also, where the patient is unconscious and unable to swallow, as in apoplexy. The patients experimented on were not informed as to the expected action of the injection. The stools, in the great majority of cases, were watery, resembling those produced by a free saline purgative.—Drug. Circ., 1894, 82.

Injection of Creosote-Mentholated Oil against pulmonary tuberculosis, was reported by M. De la Jarrige to the Congress for Tuberculosis, held in Paris, August, 1893. The formula which he employs is as follows: Sterilized oil, 100 Gm., creosote, 10 Gm., menthol, 5 Gm., of which 30 C.c. are injected directly into the trachea.

Upon the same occasion, Weill and Diamantberger reported satisfactory results from *guaiacol* injections; their formula is—pure guaiacol, oil of sweet almonds, sterilized at 120°, of each equal parts. The injections are made with a syringe of 50 C.c. capacity, commencing with one-quarter of that quantity and increasing to daily doses of one or two of the full capacity, or in severe cases to even as high as eight injections per day.—Rev. de Thér. Méd. Chirurg., 1893, 519; Amer. Jour. Pharm., 1893, 551.

Iodine Trichloride by subcutaneous injection has been recommended by S. Gottschalk, of Berlin (Deutsche Med. Woch.), for puerperal fever. He used 1 to 2 C.c. of a one per cent. solution, and observed no untoward effects, either local or systemic.—Amer. Drug. and Pharm. Rec., 1894, 328.

Arsenic Hypodermically.—Popoff advocates the injection of arsenic subcutaneously in cases where the stomach will not tolerate the drug. He uses a new alcoholic Fowler's solution, carefully sterilized and administered aseptically in doses of 8 to 9 drops.—Ibid, 220.

Infant Powders.—A writer in Gior. di Farm. et di Chim., 1893, p. 302 (through Rép. de Pharm., 1893, 364), gives the following formula: Starch, 250 Gm.; precipitated calcium carbonate, 150 Gm.; dried alum in very fine powder, 15 Gm.; boric acid, 15 Gm.; carbolic acid, 3 Gm. Aromatize with oil of citron.

Nursing-bottles and Galactophores.—Attention has often been directed to the great danger lurking in the rubber tubes employed in connection with feeding-bottles, since in spite of all that may be done by the nurse the hose will be infested by microbes. In consequence of continued agitation by the medical fraternity, particularly the Academy of Medicine, the use of india-rubber hose fittings for feeding-bottles has been interdicted by the French government. In the Charity Hospital at Paris a substitute device suggested by Budin, and called by him "galactophore," has been introduced, which is described as follows: "Two connected tubes are passed through an india-rubber stopper; one, larger than the other, enables the milk to flow, while the second, being very small, serves as a passage for air. An india-rubber teat, with a flat ring made of bone, completes the apparatus. The bottle is filled with milk and closed by the stopper, after which it should be turned upside down and the nipple placed between the child's lips. As soon as the latter sucks, the liquid enters his mouth. The tube destined as an air-passage should be very small; in this way the milk cannot escape, and it does not desend too rapidly. Whatever kind of apparatus is used, frequent cleansing with boiling water is necessary to prevent the formation ot germs." This galactophore is attached, at the Charity, to an ordinary medicine bottle.—West. Drug., 1894, 18.

Examination of Gases from the Stomach.—Description of apparatus and record of results.—Ibid. 21; from Prag. Med. Wochenschr.

Nucleoproteïds.—O. Hammarsten. In diabetes there is no longer any doubt that in many cases the sugar originates from proteïds. A knowledge of gluco-proteïds (proteïds from which sugar is obtainable by hydrolytic agents) is therefore of practical importance. Such proteïds are obtainable from the mammary gland, the liver, and the pancreas; the present paper relates to that obtained from the pancreas.—Zeit. physiol. Chem., 1894, 19.

Paper for Perfuming Apartments.—A paper has recently come into use abroad which is used as a disinfectant and perfumer of the sick room, apartments, etc. The paper is to be burned in the rooms. The two following are given as sample formulæ :

(1)	Oil of cloves	30 parts.
	Oil of canella	36 "
	Oil of bergamot	48 "
	Oil of lavender	48 "
	Tincture of benzoin	420 "

Mix.

(2)	Peru balsam	15 parts.
	Oil of cloves	30 "
	Oil of bergamot	30 "
	Acetic ether	30 "
	Tincture of musk	6 "
	Tincture of vanilla	60 "
	Tincture of benzoin	150 "
	Tincture of cedar-wood	30 "

Mix. Unsized paper is impregnated with the liquid, dried, and cut into pieces of a convenient size.—Nat. Drug., 1894, 113.

Lactic and Butyric Acids in the Stomach Contents—Detection of.—Saundby (Amer. Drug. and Pharm. Rec., 1893, 184). The test for lactic acid is made by adding to a 1 per cent. solution of carbolic acid a few drops of perchloride of iron, and diluting this, if necessary, with distilled water until the solution turns a pale amethyst color. On adding a little of the filtered stomach contents the amethyst blue turns to a canary yellow if lactic acid be present. This reaction is given by lactates as well as by lactic acid, and by other substances, such as alcohol ; but under the conditions of the experiment these fallacies are of no importance. If the solution turns pale yellow, with a reddish or brown luster, butyric acid is present ; but this, too, is not important, though the fact is of value in the examination of vomited matter, for butyric acid is a product of fermentation in the stomach, and is a very powerful irritant of the gastric mucous membrane.

Abuse of Sodium Bicarbonate.—Rosenbach calls attention to the more serious troubles that arise through the constant and excessive use of bicarbonate of soda.—Bull. Pharm., 1893.

Peptonization in the Stomach.—Mathieu and Hallopeau conclude that the maximum richness of gastric juice in peptone coincides with the maximum richness of chlorine in nitrogenous combination and of total chlorine. The combined chlorine is at least momentarily in combination with the peptone, as well as the other albuminoid substances, when the figures are at their highest. It is not, however, in constant proportion with the quantity of dissolved albuminoid substances contained in the stomach at the moment when digestion is at its maximum, and cannot, therefore, serve to determine the amount of chloro-peptonization performed by the stomach.—Arch. de Méd. Exper., No. 3, 1893.

Potassium Thiocyanate in the Stomach.—G. Kelling. It is shown that potassium thiocyanate is present in the stomach contents; it may be recognized by the ferric chloride reaction, and presumably comes from the swallowed saliva. The amount of hydrochloric acid in the stomach makes a difference in the reaction. If saliva is mixed with dilute hydrochloric acid, carbonic anhydride comes off, and the ferric chloride reaction is weaker. On the addition of stronger hydrochloric acid, the intensity of the reaction increases in time. The presence of potassium thiocyanate is a source of error in Uffelmann's reaction for lactic acid.—Zeit. Physiol. Chem., 1893, 397.

Sterilization of Catgut.—Kepin describes the following process for sterilizing catgut intended for use in surgical operations, by the vapor of superheated alcohol: All grease is first removed by the solvent action of ether or carbon bisulphide, and the catgut is then dried in a hot-air chamber, the temperature being gradually increased to 110° C. To avoid reabsorption of water, the catgut should next be sterilized without delay, by being placed together with a little absolute alcohol, in a glass tube or metallic cylinder, be hermetically closed, and heated to 120° C. in an autoclave for an hour. If desired the catgut may be passed through a solution of chromic acid after removing the grease and before desiccation, but this is not essential, as the product is perfectly satisfactory without this treatment. The sterilization has been shown by experiment to be perfect, and the catgut is also excellently preserved, whereas, if sterilized by heat, it is transformed into gelatin.—Ann. de l'Inst. Pasteur, viii, 170.

Salt as a Sweetener of Sugar.—Zuntz's experiments indicate that if to a solution of sugar there be added a slight amount of salt and water, so weak that it excites no saline taste, the result is extra sweetening of the sugared water. The weakest of quinine solutions is said also to produce similar results. The explanation given of the above seeming incongruity is that the ever so feeble saltness or bitterness imparts an increased sensibility to the sensation of taste by the simultaneous stimuli, and hence an appreciation of additional sweetness.—British Medical Journal, 1893.

To Prepare Iodoformed Sponges.—The Revue de Pharmacie de Gaud gives the following: Select fine soft sponges of a proper size, boil them for a few moments, and then place them in a 5 per cent. aqueous solution of hydrochloric acid. Leave them in the acid for five days, then wash in clear water and dry them. Finally soak them in an ethereal solution of iodoform (75 parts iodoform to 1000 parts of ether), remove dry and preserve in hermetically sealed vessels.—Nat. Drug., 1894, 176.

Substitution of Strontium for Calcium in the Animal Organism.—H. Weiske. A reply to the portion of Haselhoff's paper (this vol., II., 207), dealing with the animal organism. The author maintains that, whilst strontium is not a poison, animals fed with it, instead of with calcium, will not live, and that whilst strontium may be conveyed to the flesh and bones, etc., it is not a substitute, physiologically, for calcium.—Lander, Jahrb., 1894, 119; Jour. Chem. Soc. (Abs.), 1894, 198.

Therapeutic Terms for Pharmacists and Physicians.—H. M. Whelpley, in Meyer Bros. Drug., 1893, 204, 222, etc.

TOXICOLOGY.

Different Toxicities of Stereoisomeric Bodies.—C. Chabrié expresses the opinion that stereoisomeric bodies may have different toxicities. He reserves the question of the two conicines and has studied the four tartaric acids. The laevo-rotatory acid is more poisonous than the dextro-rotatory acid, both are more poisonous than racemic acid, and the inactive acid incapable of being split up. He represents the relative poisons of these acids required to produce a fatal effect as 34.26, 104.24, 165.25 and 196.27. He concludes with the consideration that the spores of penicillium, mixed with a solution of racemic acid, split it up into a laevo-rotatory acid which they tolerate for a time. Hence it results that a slightly poisonous solution has become more poisonous under the influence of micro-organisms without the production of a chemical compound of a new species. This will be poisoning without a poison. If, instead of a racemic solution, we have a solution of the inactive acid which cannot be split up, the spores have not increased its toxicity; and the author asks if the intangible differences between an individual enjoying immunity, may not depend on circumstances, that the one has in its liquids the same products as the other, but in a different stereoisomeric condition. The author proposes to study pathological bloods and those of vaccinated and non-vaccinated subjects, to verify this hypothesis.—Chem. News, 1893, 37; from Bull. de la Soc. Chim. de Paris, 1893, No. 10.

Progress in Toxicology.—Record of recent events, in Chem. Zeit., 1893, 1769, by Jos. Mevinny.

Toxicological Estimations for Metals.—M. Garnier considers the two points: (1) the destruction of organic material, and (2) the precipitation of metals by H_2S. The author describes and figures a piece of apparatus for the latter proceeding.—Jour. Pharm. Chim., 1893, 193.

Toxicological Detection of Phosphorus.—J. V. D'Hagen and P. Woltering mention a case of supposed phosphorus poisoning, in which the phosphorus could not be proved by post-mortem appearances, or by the conventional chemical analysis. On distilling, however, the contents of the large intestine in a current of carbolic anhydride, gases containing phosphorus were given off. The authors did not venture to decide whether or not these gases were caused by a putrefactive process.—Chem. Central, 1893, 1103; from Med. Tydschr. Pharm., 1803, 343.

Toxicological Detection of Phosphorus.—H. W. Bettinck and F. C. E. v. Embden failed to detect phosphorus in the body of a man eight days after death. Traces of hypophosphorous acid and hydrogen phosphide could, however, be detected in every distillate. As the deceased had been medically treated with hypophosphites, the finding of volatile phosphorus compounds did not positively point to a poisoning with phosphorus. To throw some light on the case, the authors carefully searched for arsenic, as this is nearly always contained in commercial phosphorus, but rarely, if ever, in hypophosphites. They succeeded in demonstrating the presence of arsenic in the fatty degenerated liver.—Chem. Central., 1893, 1104; from Ned. Tydschr. Pharm., 1893, 343.

Detection of Strychnine.—Ranke (Bull. Pharm., 1894, 71) proceeds as follows for isolating the alkalon. The suspected object is most finely divided, and allowed to stand with water acidified with acetic acid for twenty-four hours, strained, and the operation repeated; 96 per cent. alcohol is added to the mixed strained liquid, which is then filtered, the evaporated filtrate taken up with water, lead acetate added, and the precipitate filtered off after twenty-four hours. The precipitate is washed with alcohol until the washings pass completely neutral, which occupies several days, and the alcohol evaporated from the filtrate and washings. Lead is then removed by means of sulphuretted hydrogen, and the residue filtered, evaporated nearly to dryness, taken up with alcohol, filtered, and again evaporated. An aqueous solution of the residue slightly acidified is then shaken out with chloroform until no more color is extracted, then made slightly alkaline with sodium carbonate, and the strychnine taken out of the alkaline liquid with chloroform.

POISONS AND THEIR ANTIDOTES.

Toxicology.—Action of Poisons.—C. A. Seifert, in Pacific Drug., 1893 and 1894. A lecture containing a brief account of general symptoms produced; modes of causing death; antidotes and general treatment.

Treatment of Poisons from a Pharmaceutical Standpoint.—D. C. Mangan, in Pharm. Era, 1893, 541.

Potassium Permanganate as a Chemical Antidote in Organic Poisons.—J. Anal, in Pester. med.—Chir. Ztg., 1893, 147; Pharm. Post, 1893, 332.

Lavage of the Stomach in Toxic Poisoning.—Experiments have shown that after the subcutaneous injections of morphine in dogs, as well as in human beings, the drug very rapidly makes its appearance in the stomach. The result of experiment goes to show that about one-half of the quantity of the drug injected may be removed by lavage; but if an hour or so be allowed to elapse before lavage is carried out, the drug will have been reabsorbed. Somewhat ingeniously, the attempt has been made by Alt (Med. Press, 1893, No. 2,815) to ascertain whether the poison of venomous snakes could be gotten rid of by these means; and, so far, the experiments in this direction have been satisfactory in proving the utility of the method. Doses of snake-poison injected subcutaneously into dogs were rapidly fatal to those animals in which nothing was done; while the same doses were recovered from when lavage of the stomach was carried out for about an hour immediately after the injections.

Antidote for Arsenic.—Consideration of the question as to the behavior of the compound of arsenic and ferric hydrate in the system.—Pharm. Zeit., 1894, 163; Pharm. Rund., 1894, 91.

Chemico-Legal Side of Arsenical Poisoning.—Report of a case by W. P. Mason, in Jour. Anal. and App. Chem., 1893; Drug. Circ., 1894, 89.

Permanganate as an Antidote to KCy.—J. Kossa (Vratch, through Nouv. rém., ix., 567), considering that potassium permanganate ought theoretically to act as a chemical antidote to potassium cyanide, by checking the paralysis of the respiratory centres, has performed some experiments, the results of which appear to fully justify his hypothesis. Rabbits were shown to be fatally affected in a few minutes by 0.01 Gm. of the poison, but if, at the time of administration, 0.5 Gm. of permanganate dissolved in 50 C.c. of water was introduced into the stomach, doses up to 0.1 Gm. failed to cause death. Successful experiments were also performed with aqueous solutions of hydrocyanic acid containing 0.1 per cent. It is suggested, therefore, that in cases of cyanide poisoning, ½ to ⅓ litre of a 3 to 5 per cent. solution of permanganate be administered immediately.—Pharm. Jour. Trans., 1894, Feb., 622.

Injuries from Carbolic Acid.—Warnings are given in a German medical journal against the injury to skin, and even bone, which may result from the long continued use of weak—say 3, 2½, or even 2 per cent.—carbolized applications, especially upon peripheral portions of the body, such as the fingers. This effect, it is asserted, is due in a small measure to the action of carbolic acid upon the vaso-motor system, but in the main to its destructive effect upon the red and white blood-corpuscles. This induces, partly in a mechanical and partly in a chemical way, stasis, first in the capillaries, and, if the action of the drug be continued, then in the larger veins and arteries, with the result that the nutrition of the part is interfered with and the removal of harmful substances hindered; the maceration of the epidermis caused by the acid favors evaporation, so that the gangrene is a dry one, a mummification as it were. The opinion is also expressed that even weak carbolic solutions, as external applications, are to be either completely discarded or to be used only with the strictest precaution.—American Analyst, 1893; Bull. Pharm., 1893, 517.

Carbolic Acid Poisoning—Antidotes for.—Schobert, in Pharm. Zeit., 1894, recommends saccharate of lime as long as the latter remains in the stomach. After it is supposed to have passed into the intestine, sodium sulphate is the antidote. The following is the formula for preparing saccharate of lime:

Quicklime	15 parts.
Sugar	25 "
Water, q. s. ad	100 "

Mix and dissolve. The solution contains one-half of one per cent. of calcium hydroxide.—Nat. Drug., 1894, 49.

Hydrogen Sulphide as a Poison.—Lehmann has established by an elaborate investigation that the inhalation of 0.07 to 0.08 per cent. of hydrogen sulphide in the atmosphere produces in the course of a few hours very dangerous symptoms, the presence of 0.1 to 0.15 per cent. causing death quite rapidly; 0.015 per cent. in the air can be inhaled for some hours without detriment, but more than 0.02 per cent. produces injurious effects. The system cannot be made to tolerate this gas; on the contrary, it becomes more sensitive upon repeated inhalations. Uschinsky could not find any evidence that the gas acts as a hypnotic, as Schulz states.—Drug. Circ., 1893, 204.

Aconitine Poisoning.—Veil reports (La France Med.), the case of a pharmacist who, by accident, took a pill containing 12 milligrams of crystallized aconitine. The poison was taken at half past eleven in the morning, and on the appearance of the very first symptoms the attending physician administered 20 grains of powdered ipecac and $\frac{1}{12}$ grain of emetine. The stomach was also washed out. After the vomiting had occurred the patient noticed a sensation of burning in the mouth, about the face and in the extremities. Forty minutes after the poison had been taken the face was pale, the voice was almost lost, there was a feeling of impending death, and loss of consciousness. The pulse was very small, difficult to count, and the action excessively rapid. The respiration was feeble and irregular. The extremities were cold and the skin was covered with a clammy sweat. At this time, rubbing, the application of hot water bottles, and the injection of 15 grains of caffeine and 45 minims of ether, was resorted to. The pulse was now 40 to 50 a minute. The vomiting continued. After this, iced champagne was administered and stimulating applications with friction were applied to the extremities. On the return of the physician two hours later the condition of the patient was still most alarming; the pupils were dilated, the skin was cold, the pulse completely lost, the respiration almost gone. The pulse was now 30 per minute, and the pupils became excessively dilated; there was also muscular trembling; the vomiting did not cease. At this time 15 grains of caffeine and 30 minims of ether were again given, and produced an improvement in the symptoms. The use of the caffeine to the amount of 7 grains was frequently resorted to throughout the night. The severe symptoms disappeared after nine hours. The vomiting ceased during the night, under the influence of chloroform water and paregoric. For two or three days the prostration was exceedingly severe, and at the end of the week the patient had not entirely recovered.—Ibid., 1894, 83.

Belladonna Plaster Poisoning.—Record of a case by E. E. Maddox, in Am. Jour. Med. Sci., 1893; Drug. Circ., 1894, 10; Registered Pharm., 1894, 314.

Benzine Poisoning.—Rosenthal reports a case in Brit. Med. Jour.; Am. Drug. and Pharm. Rec., 1893, 339.

Kerosene Poisoning.—Indian Med. Rec.; Chem. and Drug., 1893, 162.

Bromoform Poisoning and Bromoform in Pertussis.—(Nolden, Ref. Archives Kinderheilkunde, B. xv., H. iii.–iv.)—A child two and one-half years of age drank four Gm. of bromoform, and a three-year-old child six Gm. In both the swallowing of the drug was quickly followed by loss of consciousness, asphyxia, absence of apex beat, slow, small pulse, cyanosis, sub-normal temperature, and pulmonary œdema. Under the free use of stimulants both recovered. While the first-mentioned case was under the influence of the bromoform, a severe coughing paroxysm occurred. In the second case the disease was much less severe after the effects of the drug had worn off. The results in general with bromoform in the management of pertussis were no better than those obtained in the use of the older remedies.—Notes on New Rem., 1893, 135.

Chloralose Poisoning.—P. W. Watson describes a case of poisoning by chloralose, which has been generally regarded as a perfectly safe hypnotic. Fortunately the effects were not fatal, but the administration of a second ten-grain dose to a lady within twenty-four hours of the first dose—which seemed to cause no ill effects—was succeeded by an attack of acute delirious mania. On recovering, the patient was extremely prostrate, and had no recollection of what had passed since taking the chloralose. The drug appeared to stimulate the heart's action, and it is suggested that caution should be observed in administering it in cases where chloral is distinctly contra-indicated.—Practitioner, lii., 98.

——— See Lang in Brit. Med. Jour., 1700, p. 233; Notes on New Rem., 1893, 104.

——— *Treatment.*—1. Avoid all disturbance of the stomach by attempts to evacuate it; and specially avoid emetic remedies, since nothing depresses so much and assists in reducing animal temperature as vomiting.

2. Place the body at once in a warm atmosphere; keep the body itself very warm, but of all things see that a warm atmosphere is inspired. The air to be breathed should be raised and sustained at 90° F. at least.

3. Be most careful in sustaining the body by the administration of warm food. Hot milk, to which a little lime water has been added, is the best

food that can be supplied. If it is impossible to make the patient swallow, the milk is easily introduced into the stomach by the long nostril tube. It need not be thrown in rashly, but may be made to enter in a gentle current. It is good practice also to administer frequently an enema of beef tea or of milk and water as warm as it can be borne, the heat being of as great value as the food that may be absorbed.

4. Sustain the breathing should that begin to fail. In the lower animals, under the profound influence of chloral, the respiration always ceased before the motion of the heart. This was so decidedly the case that in some instances, in which every sign of life had passed away, it was observed, on laying open the chest for post-mortem purposes, that the muscular walls of the cardiac cavities still showed signs of irritability. Hence the importance of gentle artificial respiration. No complicated artificial apparatus is demanded. A pair of small parlor bellows suffices. To the nozzle of such bellows attach an india-rubber tube, and at the other or free end a nostril tube. Place the nostril tube in one nostril, close the other nostril by pressure, close the mouth, and by the slow action of the bellows gently inflate the chest; then remove the nostril tube for the moment, allow the chest to empty itself, and repeat. One charge of air, given at intervals of ten seconds from each other, and without the least violence, is all sufficient, since a small quantity of air is necessary to keep up the respiration as would be required, if the body were in a state of catalepsy or of hybernation. It is very important all through the process to see that the bladder is kept free from distension, and to relieve it, from time to time, by the catheter, if there be no natural micturition.—Sir Benjamin Ward Richardson in Amer. Drug. and Pharm. Rec., 1894, 110.

In Chloroform Poisoning Washburn has found strychnine useful. To a man who had swallowed 2 oz. of the anæsthetic $\frac{1}{20}$ gr. of strychnine was given hypodermically, and later $\frac{1}{60}$ gr. This, with artificial respiration, sufficed for recovery.—Chem. and Drug.. 1894, 537.

As Antidote for Hypochlorites, such as Javelle water, Labarraque's solution, etc., Carles (Therap. Blätter) recommends solutions of neutral sodium sulphite or hyposulphite. Ammonium chloride or sulphate also decomposes hypochlorites at the temperature of the body. In case of these salts not being obtainable, Carles recommends that the patient drink urine, the urates in which act as an antidote to the hypochlorites.—Ibid., 189.

Cocaine Poisoning.—Record of cases. A. R. Baker (Amer. Jour. Ophthal.; Drug. Circ., 1894, 83); Neill (Chem. and Drug., 1894, 206).

Tartrated Solution of Corrosive Sublimate.—E. G. Thornton states that an alkali must first be administered to neutralize the acid, and the reaction between the albumen and corrosive sublimate can then take place.—Drug. Circ., 1894, 34.

Male Fern—Poisonous Effect of.—J. H. Grant (in Bost. Med. and Surg. Jour.).—Ibid., 106.

Antidote for Morphine—Potassium Permanganate as an.—Article by Wm. Moor, who claims this to be a new antidote for morphine.—Reprinted in Drug. Circ., 1894, 75; from Med. Rec., 1894. See also Registered Pharm., 1894, 114.

Strychnine in Mushroom Poisoning.—M. Konigsdorfer has obtained excellent results with strychnine given in 1 milligramme doses hypodermically.—Nouv. Rem.; Montreal Pharm. Jour., 1894, 81.

Potassium Permanganate as an Antidote.—Schlagdenhauffen and Reeb refer to the fact that J. Antal has found permanganate of potassium to act as an antidote to phosphorus, muscarine, strychnine, colchicine, oil of savin, and oxalic acid, when administered to frogs, rabbits and dogs, with or directly after the poisons, and then proceed to describe the result of experiments conducted by themselves to ascertain the effect of the permanganate upon coronillin, $C_{11}H_{12}O_5$, a poisonous bitter principle isolated by them some years ago from the leaves of *Coronilla Scorpioides.* They find that when the salt is placed in direct contact with the glucoside the latter is decomposed, being entirely oxidized, and physiological tests, in which frogs, pigeons and guinea-pigs were used, seemed to prove that the permanganate is a true antidote to the poison when administered within a sufficiently brief time after the latter.—Jour. der Pharm. von Elsass Loth., xx., 322.

Phosphorus Poisoning.—Successful results from drinking solution of permanganate of potassium.—Erdos (Norsk Magazin for Laevidensk), Drug. Circ., 1893, 226.

——— Wünzer records the following therapeutic indications:

1. To remove the phosphorus from the gastro-intestinal canal, by means of lavage of the stomach, and evacuation of the intestines with purgatives. The lavage is considered quite useless if more than twenty-four hours have elapsed since the ingestion of the poison; still a trial of it is recommended even then. The administration of cathartics, on the other hand, is always indicated, particularly in the first few days after the poisoning. The use of bitter waters or infusion of senna (10 Gm.: 200 Gm. of water) is preferred; while, naturally, oily purgatives—such as castor oil, etc.—are to be avoided.

2. To render inert any particles of phosphorus that might have remained in the gastro-intestinal tract, for which purpose the author employs copper acetate, or copper sulphate, or—better still—old, oxidized turpentine oil.

3. To overcome the general acidity, which while it appears merely as a symptom of the poisoning, may provoke certain disturbances. It therefore seems quite rational to combat the same with large doses of sodium bicarbonate, 10–20 Gm. daily.

4. To administer highly nutritious food, rich in albumin, as soon as there is even the slightest tendency toward assimilation of nutriment.—Amer. Drug. and Phar. Rec., 1883, 252; from Prager Med. Wochensch., 1893, No. 32.

Poisoning by Eucalyptus Oil.—Neale reports (Australasian Med. Gaz.) a case of fatal poisoning by oil of eucalyptus; also several cases wherein profound toxic effects were induced by the same drug, but with ultimate recovery.—Amer. Drug. and Pharm. Rec., 1893, 338.

Poisonous Linseed Oil.—An examination was lately made by Pieszeeck of some linseed oil which, when taken into the stomach, produced general indisposition, dizziness, and vomiting. A sample of the linseed that had yielded the oil was found upon analysis to contain not less than 35 per cent. of impurities, including especially 15 per cent. of the seeds of darnel, a common meadow weed.—West. Drug., 1893, 182.

Mercurial Oil.—Death from injection.—West. Drug., 1894, 59.

Poisoning by Pyridine.—Pharm. Jour. Trans., 1893, 329.

Spigelia (Pinkroot).—Poisoning recorded by J. E. Free in Med. and Surg. Rep.; Drug. Circ., June 1894.

Detection of Strychnine in an Exhumed Body.—W. A. Noyes reports (Jour. Am. Chem. Soc.) the detection of strychnine in the viscera of the exhumed body of a child which had been buried 308 days. It had been stated by some toxicologists that the alkaloid had never been found in an exhumed body after the lapse of 43 days. The strychnine obtained in this instance, amounting to about 2 milligrams, was identified not only by the sulphuric acid and dichromate color test, but by the form and double refraction of the crystals of chromate, and by the physiological test with a frog.—Drug. Circ., 1894, 124.

In Strychnine-poisoning the largest percentage of the alkaloid, proportionate to weight, is found in the kidneys. The following are the quantities given by Ipsen (Phar. Zeit. f. Russ.):—Kidneys, 1.4 milligramme per 100 grammes; liver, 0.7; lungs and heart, 0.6; and the smallest amount is found in the bowel—viz., 0.08 milligramme per 100 grammes.—Chem. and Drug., 1893, 796.

Poisoning with Turpentine.—Carveth (Canadian Pract.) records case in Drug. Circ., 1893, 204.

Poisoning by Vanilla.—J. C. White. In the lower qualities of pods it is known that an artificial method is used for coloring them black, and that the material used is the oil found in the rind of the cashew nut, called cardol. This nut is the fruit of Anacardium occidentale, and is grown in the West Indies largely, and eaten both raw and roasted. The oriental species is called the Indian marking nut, as it has the same property of turning black any substance with which it comes in contact that the juices of the poisonous forms of Rhus possess, and it has likewise the same poisonous quality that they have, so that many cases of poisoning are produced by persons handling these nuts without sufficient care. Charles Kingsley, in his work on the West Indies, describes several cases where cooks and others have been poisoned by roasting them. Cardol is used to color the poorer qualities of vanilla pods, such as produced poisoning in a patient who recently came to him suffering from dermatitis venenata. They are of the poorer variety, and are worth about four dollars a pound, whereas specimens of the best qualities are worth about twelve dollars a pound. The color of both is about the same, but there is no doubt that these poorer ones have been colored by cardol.—Pharm. Jour. Trans., 1894, 565.

Poisoning from Vaseline.—A company of the Forty-second French Infantry, while in garrison at a fort at Belfast, were served one day with beef and green salad. This was followed by the illness of nearly all the soldiers, they being affected with headache, vomiting, and stomach-ache. On investigation, it was shown (Pharm. Post), that the poisoning was due to so-called vaseline oil, which had been issued to grease the guns with, but which had been used in making the salad.—Amer. Drug. and Pharm. Rec., 1894, 118.

Poisonings in England during 1892.—Statistics in Brit. and Col. Drug., 1894, 573; from Registrar General's Report.

Thyroid Gland—The Pharmacy of the.—E. White describes at length the results of his experience in preparing the thyroid gland of the sheep for medicinal use, the special consideration being devoted to preparations for administration by the mouth. The means employed for obtaining the glands and the precautions to be observed during the operation are described and explained. Though the thyroids of other animals have been used, that of the sheep is generally preferred. The average weight of each lobe when trimmed is about 45 grains. The preparations described are:

1. The fresh gland entire given by the mouth.
2. Glycerin extracts (*a*) from fresh glands, (*b*) after treatment with absolute alcohol.
3. Dilute alcohol extract.
4. The precipitate produced by the addition of absolute alcohol to glycerin extract.
5. The dried gland.
6. The precipitate produced by formation of calcium phosphate in glycerin extract.

With regard to the dose required he has found that one-sixth of a gland, or its equivalent, in a suitably prepared form, daily by the mouth, gives very satisfactory results in myxœdema. For the hypodermic method a glycerin extract has been hitherto employed.

Since it seems probable that the remedy will have to be continued for some time after the removal of the urgent symptoms of myxœdema, in order to prevent relapse, he suggests the admixture of thyroid powder to the extent of 2 per cent. with ordinary table salt, the mixture to be used by the patient in the ordinary way with food. The mixture is indistinguishable from ordinary salt in taste or odor, and would offer an easy means of supplying the remedy in a continuous and imperceptible manner.—Pharm. Jour. Trans., 1893, 194.

UNGUENTUM.

Diffusion of Potassium Iodide.—H. L. Roberts finds that, when used as a basis for ointment of potassium iodide, lard offers less hindrance to the diffusion of the salt through sheep's bladder into water at the ordinary temperature than wool-fat or soft paraffin, the last-named being most obstructive. Thus, in thirty-six hours an abundant trace of iodine could be detected in the water when lard was used, a distinct one in the case of wool-fat, and but a slight trace with the paraffin. When, however, parchment paper was substituted for sheep's bladder the first two seemed to act alike, a slight trace only of iodine being detected after thirty-nine and a half hours in each case, whilst the result was nil with the third medium. These results appear to indicate that very slight changes of treatment may induce notable variations in the absorption of drugs from ointments through dead membranes, and Dr. Roberts hints that the influence of changes of conditions in the living tissues of the skin may be of still greater importance (Brit. Journ. Dermatology, v., 218).—Pharm. Jour. Trans., 1893, 83.

VENOM OF VIPER.

Observations on M. Calmette's Paper on the Poison of Serpents.—C. Phisalix and G. Bertrand claim priority in the announcement of the fact that the venom of vipers on exposure to heats of 75° to 80° C. possesses in aqueous solution vaccinating properties against the venom in its original state, and that the blood of animals thus immunized becomes capable of neutralizing the effects of the original venom. M. Calmette appears to have re-published these results without reference to the authors.—Compt. Rend., cxviii., No. 19.

Attenuation of the Venom of the Viper by Heat—Inoculation of Guinea-Pigs against this Venom.—C. Phisalix and G. Bartrand. Classic authors admit that the venom of the viper may be submitted to ebullition without losing anything of its poisonous properties. The similarity of the active principles of this venom to the diastasic substance renders this assertion a priori improbable, and a systematic study of the action of heat has led us to contrary conclusions. The authors have further recognised that this venom after exposure to heat possesses vaccinating properties. The failures of earlier experimentalists may have been due to the circumstance that they used too large quantities of the heated venom, so that in spite of a partial destruction there still remained enough toxic matter to prove fatal. Hence they have operated with a limited quantity, the effects of which they had ascertained by earlier experiments. They submitted to the test of mortal inoculation guinea-pigs which had received some days previously an injection of venom attenuated by heat, and observed that the animals not only did not perish, but that they did not present any appreciable symptoms of poisoning. They repeated these experiments several times with the same success upon guinea-pigs which had received previously injections of venom heated for five minutes to 75°, 80°, and 90° C. The experiments showed that the venom which had been heated raised the temperature of the subject. The original venom, on the contrary, even in doses of 1–10th Mgm. always reduces the temperature. This hyperthermia is still more marked at 80° and 90° C. Further, the heated venom has a vaccinic action, whilst the original venom, even in minute doses, produces merely a slow and progressive toleration of the poison, but no real vaccination. They felt authorized to formulate the following conclusions: In the toxic constituents of the venom there is reason to distinguish (1) a substance with a phlogogenous action comparable to certain diastases, for which they propose to reserve the name echidnase; (2) a substance having a general action powerfully affecting the nervous system, disturbing the functions of the vaso-motor apparatus, and sufficient to bring on death. Its effects are shown in the guinea-pig by a considerable hyperthermia. They call this substance echidnotoxine.—Compt. Rend., cxviii., No. 6.

Presence of Poison Glands in Colubrine Serpents and in the Toxicity of their Blood.—C. Phisalix and G. Bertrand injected the blood of two serpents into the circulating system of guinea-pigs. The symptoms produced were similar to those produced by the bite of the viper, and fatal.—Compt. rend., Jan. 8, 1894.

WOUNDS AND BURNS, ETC.

First Aid to the Drowned, Asphyxiated and all Other Persons in a State of Apparent Death.—A circular for the French army in Anam.—Reprinted in Nat. Drug., 1893, 148.

Immediate Management of Sudden Illness—Hints on.—J. K. Crook, in a lecture to pharmacists, discoursed on the following emergency cases: fainting; shock, collapse or prostration; cerebral apoplexy; compression of the brain; concussion of the brain or stunning; heat stroke or sun stroke; heat exhaustion; epileptic paroxysms or fits; hysterical attacks; alcoholic stupor; asphyxiations from illuminating gas; wounds; contusions; torn or lacerated wounds; poisoned wounds; hemorrhage or bleeding.—Alumni Jour., 1894, 73.

Carbon Dioxide, Carbonic Oxide, Sulphuretted Hydrogen and Water *and Coal Gas on Animal Life.*—J. R. Wilson has experimented with these gases on rabbits.—Amer. Jour. Pharm., 1893, 561.

Glycerin as an Application for Painful Burns.—M. Grigorescu (L'Union Médicale) reports that he has successfully treated extensive burns with pure glycerin, applying a few drops to the surface and rubbing it very lightly. The first sensation is a burning one, which is succeeded immediately by a kind of anæsthesia. Fatal inflammation, which, according to the author, would have occurred in numerous instances under any other treatment, was thus avoided in every case. Further, he claims that the elimination of the epithelial layer in masses is prevented by this treatment, and occurs only little by little. It is essential that the burned surface be kept constantly moistened with the glycerin. Freyssinger, in commenting on the above, states that it has long been his habit to keep ready-prepared the following prescription, which not only he, but a number of confréres, had found to be singularly efficacious in the treatment of burns:

Laudanum de Rousseau	3 parts.
Cherry laurel water	20 "
Glycerin, pure	40 "

Mix. Wet compresses with this mixture and keep constantly applied to the burnt surface.

The best application ever used in burns is camphophenique, mixed with three or four volumes of olive oil. In small, but painful burns, like that from the pencil of flame of a blow-pipe, the remedy is used pure, and rarely fails to still the pain in two or three minutes. In one case, of a horribly painful burn of the hand, received from a live electric-light wire, glycerin and an aqueous solution of cocaine (cocaine hydrochlorate, 3 grains; water, 1 dram; glycerin to make 1 ounce) was the most effective application.—Nat. Drug., 1894, 81.

Applications for Burns.—A paste of bismuth subnitrate and water.—Pharm. Era, 1894, 59.

——— A writer to the Eclectic Med. Jour., recommends washing the parts with a solution of carbolic or salicylic acid, then clip the blister, let out the fluid, and cover the burned surface with subnitrate of bismuth, then with antiseptic cotton. The latter is removed and changed from time to time, the burned surface being dusted with the bismuth. The pain ceases in a very few minutes, and the healing process proceeds rapidly.—Chem. and Drug., 1893, 271.

——— Saalfeld (Amer. Drug. and Pharm. Rec., 1894, 106).

Tannic acid	½ dr.
Alcohol	1¼ fl. dr.
Collodion	5 fl. dr.
Tr. benzoin	½ fl. dr.

Paint upon the surface.

Alum	1 fl. dr.
Yolk of egg (boiled)	No. j.
Glycerin	½ fl. dr.

Or—

Alum Borax	āā ½ dr.
Rose water	5 fl. oz.
Tr. benzoin	1¼ fl. dr.

Sig.—Apply upon compresses.

Applications for Burns—Picric Acid Treatment.—This consists in applying lint saturated in a solution of about ½ per cent. of picric acid solution to the injured surface, the dressing being well wrung out before being applied. In ordinary cases the dressing need only be changed every three days, and afterward every four or five days; it is considered preferable to allow the dressing to dry at leisure without covering it with mackintosh. Picric acid has a marked anæsthetic action on burns, in addition to its antiseptic and healing properties. There is no danger from erysipelas by its use, and no irritation of the skin is occasioned. A great drawback, however, is that a lasting yellow patch is apt to appear on the place where the picric acid has been applied.—Thiery (Ibid., 280).

——— *Iron Chloride Treatment.*—Starr states that where the cuticle is gone in scalds or burns, the official tincture diluted with half to a third as much water will, applied immediately, not only allay pain but will prevent blisters. An ointment made of one part of the tincture of iron and eight parts of petrolatum or lard, makes, when spread on a soft cloth, an admirable dressing for old sores left by burns.—Ibid., 338.

——— *Antiseptic Treatment.* – Welbouchewitsch recommends that every burn should be treated as an infected wound. Thorough cleansing of the parts is the most important requisite. General anæsthesia is often necessary for this, especially in children; but burned children bear chloroform well. The dressing should be surgically complete, yet so gentle as not to further injure the damaged tissues.—Rev. Mens. des Mal. de L'Enfance, 1893, No. 9; Centralb. f. Chirurgie, Feb. 17, 1894.

——— *Use of Quinine.*—It is said (Amer. Drug. and Pharm. Rec., 1893, 360) that non-infectious wounds heal rapidly, while infectious wounds are unaffected when treated with a 1 per cent. solution of quinine.

Burns in Children are treated by Wertheimer (Archiv. f. Derm.) as follows: Wash with warm boric acid solution, cover with absorbent gauze saturated with equal parts of lime water and linseed oil and ½ to 1 per cent. of thymol, cover with absorbent cotton and renew every day. At the end of fourteen days apply on strips of absorbent gauze the following: Bismuth subnitrate, 9 parts; boric acid, 4.5 parts; lanolin, 70 parts, and olive oil, 20 parts.—Ibid., 219.

To Avoid Burning or Blistering the Hands with Benzine.—Goehring finds that the addition of a small amount, say $\frac{1}{5}$ of 1 per cent., of any soap soluble in benzine, completely answers the purpose; that the addition does not injure the benzine, and that it actually increases its properties as a wash for most purposes.—Nat. Drug., 1894, 52.

Nitroglycerin in Vomiting.—Humphries (Brit. Med. Journ., 1893, No. 1683) reports that he has employed nitroglycerin for three years in all forms of vomiting, with highly satisfactory results.

Carbonated Whey.—By the use of frozen carbonic acid gas, carbonated whey can be produced and transported in the form of syphons for the use of the sick, or for use as a beverage. Butter treated in the same manner —by means of a pressure of six atmospheres—will remain sweet and pure for five or six weeks, retaining all its natural properties.—Amer. Therap., 1893, 56.

Dulcin with Poisoned Grain for Exterminating Vermin.—It is best to use with 50 kilos the following solution, which should be prepared in a flask on a water bath:

Strychnine nitrate	150	Gm.
Alcohol (90 per cent.), Distilled water ... āā	1.5	kgm.
Dulcin	60	Gm.
Diamond fuchsin (soluble in alcohol) or anilin rubin (soluble in water)	10	Gm.

The wheat should be passed through a mill before impregnating, should be broken or pounded (not coarsely powdered), and soaked for a day in boiling water until it swells. Then, and not till then, is the boiling hot dulcin-strychnine solution added to the entire mass in a capacious kettle, mixing thoroughly for a considerable time. Experience has shown that when the grain is not broken the strychnine adheres to the outer "spelt" of the kernels, very little or no poison penetrating the inner portion. Then the mice feed on the inner part of the kernels—the "core"—and leave untouched the outer bitter shell. Spreading the poisoned grain thin on large sheets of paper, the wheat is given ample time to dry. A kilo made in this way will cost less than 50 pfennigs.—Pharm. Zeit.; Bull. Pharm., 1894, 232.

URINE AND URINARY ANALYSIS.

Urinary Analysis.—Enumeration of tests found to be valuable by Wm. B. Parker.—Amer. Drug. and Pharm. Rec., 1893, 341.

Simple Urine Analysis.—Tests, etc.—A. McKellar.—Ibid., 356; also Pharm. Jour. Trans., 1893, 474, and Chem. and Drug., Dec. 2, 1893.

Micro-Chemical Examination of Urine.—F. L. James writes about the sample for examination and the preparation of the cellular elements, etc., for examination.—Nat. Drug., 1894, 147.

Permanent Mounts of Urinary Deposits.—Von Frisch states that by the following method he is able to mount and preserve, microscopically, specimens of urinary deposits which have kept well for three years. The medium he employs is a glycerin jelly of 1 part of gelatin, 4 parts of glycerin, and 2 parts of distilled water. A drop of the deposit is placed on the cover glass and partially dried, a drop of the gelatin solution is placed on a warm slide, and the cover glass, with the deposit, carefully placed over it. The method is equally available for crystalline or organized sediments; for the latter, however, the author recommends that the gelatin should be colored with fuchsine, when the organized elements are gradually stained by the dye.—Zeitsch. Oest. Apoth. Ver., 1894.

Effect of Senna and Rhubarb on Urine Tests.—Jung has noted that after the ingestion of rhubarb or senna the urine gives the bismuth reaction for sugar. In the Pharm. Centralh. it is stated that urine passed after the administration of rhubarb reduces both Nylander's and Knapp s solutions and decolorizes Fehling's solution without causing precipitation.—Amer. Drug. and Pharm. Rec. 1894, 189.

Estimation of Alkalinity and Acidity of Urine.—E. Freund and G. Toepfer. The determination of the reaction of urine is complicated by the presence of various salts, some of which have an acid, and others an alkaline reaction. In order to overcome this difficulty, a number of indicators were examined, and it was found that some are differently affected by free acids and alkalies, as distinguished from acid and alkaline salts. A table is given of the chief results, which shows that sodium carbonate thus gives a measure of acidity, and trisodium phosphate of alkalinity. Disodium phosphate and sodium hydrogen-carbonate have an acidity to one reagent equal to their alkalinity to another. Mixtures of various salts were subjected to titration by using different indicators; a very accurate estimation of the proportions present was obtained.

Three examples of the method as applied to urine, before and after meals, are given. The first specimen of urine gave an alkaline reaction to litmus paper, but nevertheless contained a high amount of acid salts, whereas the second and third specimens, which were from the same individual, were acid to litmus paper, but still contained alkaline salts. It will be further noticed in these two specimens, that the values for the acid salts were unchanged by the meal, but that the alkaline salts were nearly doubled.—Zeit. physiol. Chem., 1894, 84; Jour. Chem. Soc. (Ab.), 1894, 260.

Urine—Determination of Acidity.—Huguet.—Jour. Pharm. Chem., 1894, 20.

Preservation of Urine.—R. Huguet recommends the addition of 2 C.c. of one of the following solutions to the urine excreted in 24 hours.

1.	Mercuric chloride	10 gm.
	Sodium oxide	1 gm.
	Water	100 C.c.
2.	Mercuric iodide	5 Gm.
	Potassium iodide	10 gm.
	Water	100 C.c.
3.	Mercuric cyanide	10 gm.
	Water	100 C.c.

—Jour. Pharm. Chem., 1894. 217.

Albumen in Urine—Detection of.—A. Ollendorff confirms the value of Zouchlos' potassium thiocyanate test. It is capable of detecting 0.005 per cent. of albumen, and other constituents of urine, with the exception of propeptone, have no disturbing influence. After taking copaiba balsam, or sandal oil, the urine may contain resin acids, precipitable by nitric acid, and therefore liable to be mistaken for albumen. Treatment of the precipitates with alcohol fails to distinguish them, since both dissolve. Alexander recommends the use of the following tests: 2 or three drops of hydrochloric acid are added to 8–10 C.c. of urine; this precipitates the resin acids. If, on adding acetic acid, a precipitate is produced not soluble in excess, this consists of mucin. A sample is heated and mixed with one-third of its volume of nitric acid (strength not stated). Since both acids and mucin are redissolved under these conditions, a turbidity indicates albumen.—Zeitschr. f. anal. Chem., 1893, 120.

The Ferrocyanide Test of Urine.—J. P. Karplus.—In testing urine for albumen by means of potassium ferrocyanide and acetic acid, a yellow coloration is frequently observed, for which no explanation has hitherto been given. As it was not improbable that the reaction might be due to the presence of nitrites, the author has examined a large number of samples of urine from healthy and diseased persons, and finds that when quite fresh none of these contain nitrites, but that when the urine has remained for periods of upwards of 24 hours, the presence of nitrites may frequently be detected. Fresh urine from jaundice patients was found to contain no nitrites, but 6 out of 12 samples which had been kept became green on addition of acetic acid, and all these, after removal of the bile pigments, gave the nitrite reaction. In testing for biliprasin in such urine, the absence of nitrites must, therefore, first be proved. In the urine of patients taking sodium iodide, free iodine occurred together with nitrites. The urine bacterium recently described by the author, has in addition to its action in forming hydrogen sulphide and probably methylic mercaptan, the property of reducing nitrates to nitrites.—Chem. Central, 1893, 406; from Centr. f. Klin. Med., 1893, 577.

Test-Paper for Albumen is prepared by Hoffmann (Bull. de Pharm. de Lyon) as follows: First dissolve 1 part of corrosive sublimate in 20 parts of distilled water, and then dissolve 1 part of potassium iodide in 2 parts of distilled water. Mix the two solutions, dip strips of filtering paper into the mixture, and let them dry. This paper, when dipped into albuminous urine, will immediately yield a precipitate, provided the urine be of acid reaction—which can be ascertained by means of litmus-paper; if necessary, acidulate with a few drops of acetic acid.

Chromic Acid Test.—M. Guerin (Jour. Pharm. Chim., 1894), gives the following method of employing this reagent: Place in a test tube of 5 to 6 C.c. capacity, 3 C.c. of the suspected urine, previously filtered then add a 10 per cent. solution of chromic acid, drop by drop. The immediate appearance of a white, flaky precipitate will indicate the probable presence of albumen. Now heat the urine just to boiling; if the turbidity persists it is certainly caused by albumen, this alone remaining undissolved, while the precipitate yielded by albuminose, peptone, etc., as also by a large number of alkaloids, will not withstand heat. There may be a slight degree of opalescent turbidity due to the resinous acids formed after the ingestion of copaiba balsam. This will not be removed by heat, but will disappear on the addition of a little alcohol. The chromic acid test is exceedingly delicate, detecting two milligrams of albumen in 100 C.c. of urine.—Drug. Circ., 1893, 151.

Trichloracetic Acid Test.—A. C. Smith (Journ. Amer. Med. Assoc.), thinks trichloracetic acid the most convenient reagent for office use in examining urine for albumen. His directions for its application are: "Place 2 to 4 fl. dr. of suspected urine, filttered, if necessary, in a small graduate glass, drop into the urine 1 to 2 small crystals of the acid, gently stir the urine with a small glass rod, aluminum probe or clean, splinter of wood; and if albumen be present in appreciable proportion, it will quickly settle at the bottom of the glass, as a white flocculent deposit. The proportion of albumen can thus be quickly estimated per volume, by reading the graduate marks, sufficiently accurate for ordinary purposes, consuming only a very few minutes, little trouble or expense, or skill.—Ibid.

Differentiation between Piperazine and Albumen in Urine.—Some time since it was announced by Roerig that the appearance of albumen in the urine followed the administration of piperazine. Biesenthal states that this is incorrect, the error arising from the fact that the supposed albumen precipitated by picric acid was in reality piperazine, itself precipitated as piperazine picrate. One part of piperazine dissolved in 20,000 of water yields a decided precipitate with picric acid. Within four hours after ingesting 1.5 Gm. of piperazine, the precipitate thrown down by picric acid amounts to one-fifth of the volume of the acid used. Under the microscope this precipitate shows the characteristic six-sided groups of crystals. To further establish the identity of the piperazine picrate add hydrochloric acid to it, agitate the mixture with ether to remove the picric acid, and add potassio-bismuth-iodide solution, when the piperazine will form the characteristic microscopic double iodo-bismuth salt. The piperazine can also be detected in the urine itself by first acidifying with hydrochloric acid and adding the potassio-iodo-bismuth iodide solution. Albumen may be detected in the presence of piperazine by the use of acetic acid for instance. In acidified urine albumen coagulates and the coagulum is permanent in either heat or cold; while the crystalline precipitate of piperazine picrate disappears on heating but reappears on cooling.—Chem. Centralh., 1893, 624; from Therap. Monatsh., 1893, 356.

Sulpho-Salicylic Acid Test.—G. McGuire employs this reagent satisfactorily for determining albumen.—New Eng. Drug., 1893, 367.

Reactions for Albumen.—Sulphocyanate of potassium and acetic acid: perchloride of mercury and acetic acid.—Amer. Drug. and Pharm. Rec., 1894, 197.

Albumen—Estimation of.—F. Klug. For the estimation of albumen the author mixes 2 C.c. of the liquid to be examined with concentrated aqueous soda, and adds 4 drops of a 10 per cent. copper sulphate solution. The carefully filtered solution is then examined in a spectrophotometer, and the intensity of the biuret coloration determined. The results obtained are trustworthy, and the whole estimation may be made in a quarter of an hour. The estimation of albumen in urine may also be carried out in this manner, as by means of an excess of copper sulphate the greater part of the coloring matters are precipitated. The amount of coloring matters may also be determined by Vierardt's method, and deducted from the total amount of coloring matter and albumen found by the author's method.—Chem. Central., 1893, 499; Jour. Chem. Soc. (Abs.), 1894, 172.

Detection of Bile Pigment in Urine.—A. Jolles.—In addition to the well-known Gmelin's test for bile pigment in urine, there are several modifications and several other tests. In all, twenty are described in the present paper, and their relative delicacy ascertained. Of these, some half dozen are so little adapted to the purpose that it is necessary to add 10 per cent. of bile to the urine in order to obtain them; and only one (Rosenbach's) of the six modifications of Gmelin's test is as delicate as the original. This requires 5 per cent. of bile. Two out of the list are so delicate as to be given by 2 per cent. of bile. Of these, Rosin's test is one (Berlin klin. Wöch., 1893, 106), and Huppert's (Arch. Heilk., xiii., 351, 476, 1887) the other.

Rosin's test consists in the grass-green ring which appears on pouring dilute iodine tincture carefully on the surface of the urine. Huppert's test is as follows: 8 to 10 C.c. of urine is precipitated with milk of lime, and the precipitate collected; the latter is then treated in a test tube with alcohol containing sulphuric acid, and the acid liquid heated to boiling, when it becomes green or blue if bile pigment is present.—Zeit. physiol. Chem., 1893, 545; Jour. Chem. Soc. (Abs.), 1894, 171.

The Test for Blood in Urine with turpentine and tincture guaiacum wood will not produce the blue coloration, according to Ferraro, if ammonium is present in the free state, even when blood is present in notable quantities. If ammonium carbonate in excess be added to a urine containing blood of faintly acid reaction, the above reagents produce the blue color, which, however, disappears under the influence of heat as ammonium is set free from the carbonate; while with the direct addition of free ammonium the tests do not respond at all.—Bollet. Farm.; through Monit. de la Pharm., 1893, 1270; Amer. Jour. Pharm., 1893, 453.

Estimation of Total Bromine in Urine.—A. Nicolle publishes the following process, based upon Dechau's process for estimating alkaline bromides: 50 C.c. urine and 2 Gm. caustic potassa are mixed, and carefully incinerated. The alkali is added for the purpose of decomposing any volatile ammonium bromide, which is liable to form in the course of the operation, into ammonium and potassium bromide. The mixture is heated to dull redness, recovered with boiling water, filtered and the volume made up to about 40 C.c; 10 C.c. pure sulphuric acid are now cautiously added and the whole introduced into a long-necked flask containing 20 Gm. potassium dichromate, and connected by means of a glass tube with another flask immersed in cold water, and containing 20–25 C.c. of a 4 per cent. potassium iodide solution. All joints of the apparatus should be made with caoutchouc, previously boiled with caustic alkali. On heating the liquid to ebullition, bromine vapors are at once formed, and are condensed in the other flask, displacing iodine; the operation completed, the contents are poured into a flask of 50 C.c. capacity, and the volume completed with water. The iodine is estimated (and the bromine by difference) by means of sodium thiosulphate solution in presence of an equal weight of starch. Following are some of the results obtained by this process:

	Bromine.	
	Calculated.	Pound.
50 C.c. urine containing 0.20 Gm. potassium bromide	0.13 Gm.	0.122 Gm.
50 C.c. urine containing 0.50 Gm. potassium bromide	0.33 "	0.32 "
50 C.c. urine containing 0.50 Gm. gallobromal or dibromogallic acid ($C_7H_4O_5Br_2$)	0.243 "	0.24 "

—Jour. Pharm. Chim., 1893, 298.

Carbohydrates of Normal Urine.—K. Baisch.—The investigations of the older chemists showed that the presence of a reducing substance, presumably sugar, was constant in normal urine. It was not, however, until Baumann's benzoyl chloride method was introduced that it became possible to isolate this substance and to study its properties; and even now the matter is far from settled, Wedeuski having shown that the carbohydrates are probably two in number, and that the benzoyl compound contains small quantities of nitrogen. The present research relates mainly to the preparation and properties of the benzoyl compound. Future papers are promised on the varieties of carbohydrate which can be obtained from it. It is, however, briefly stated that the properties of one of these correspond closely to those of dextrose.

The best proportions of reagents to use are 40 C.c. of benzoyl chloride, 400 C.c. of sodium hydroxide, to a litre of urine. Other proportions give a smaller yield with a larger amount of ash; the ash consists chiefly of magnesium phosphate, which can be removed by means of dilute hydrochloric acid. But in all cases there is from 1 to 2 per cent. of nitrogen. Similar results followed if the urine had been previously treated with normal or basic lead acetate. The melting point varied in different preparations from 95° to 130°; the carbon from 66.5 to 66.7, the hydrogen from 5.15 to 5.57.—Zeitschr. f. physiol. Chem., 1893, 193.

Chlorides in Urine—Determination of.—Freund and Toepfer (Centralblatt. f. Klin. Medecin., 1892, 301).—Mohr's process is made available by adding to the urine 1-10th volume of a mixture of 3 per cent. acetic acid and 10 per cent. of sodium acetate.

The Different Combinations of Chlorine in the Urine.—A. Berlioz and E. Lepenois.—A study upon the combination of chlorine in the urine and the determination of the causes.—Jour. Pharm. Chim., 1894, 288. In addition to mineral chlorides, the urine contains organic compounds containing chlorine. This fact is of importance in determining the variations in the amount of chlorine in healthy and pathological urines, and still more valuable would be the result if it were possible to simultaneously examine the chlorine compounds in the gastric juice.

Passage of Chloroform, Administered by Inhalation, into the Urine.—P. Vitali. Breandat (Jour. Pharm. Chim., 1893, 194) was unable to find chloroform in the urine after its administration as an anæsthetic: the author, however, employing a very sensitive process, in some cases found traces of chloroform in the urine.—L'Orosi, xvi., 299.

H_2O_2 from Urine.—A. Richardson (Jour. Chem. Soc., 1893, 1109) finds that hydrogen peroxide is formed when fresh urine is exposed to sunlight and oxygen, and is stable when the liquid has been previously sterilized, although rapidly decomposed when active organisms are present. In decomposing urine it may happen that no peroxide can be detected, even when exposure to light has taken place. In such a case it has yet been formed, however, and subsequently become decomposed, destroying by its decomposition such organisms as existed in the urine. Fresh urine

was found to possess antiseptic qualities after exposure, owing to the formation of hydrogen peroxide, and to the action of the latter compound the sterilization of urine by light is largely, if not entirely, due.

Urinary Hæmatoporphyrin.—A. E. Garrod. In continuation of previous researches, it is found that hæmatoporphyrin can generally be detected in urine; in normal urine its quantity is very small. Direct spectroscopic examination of specimens rich in hæmatoporphyrin shows that it is alkaline hæmatoporphyrin which is present.—Jour. Physiol., 1893, 108; Jour. Chem. Soc. (Abs.), 1893, 480.

Iodine in Urine.—After a comparison of the methods for detecting iodine in urine, H. Sandlund perfers to use sodium nitrite, dilute sulphuric acid, and disulphide of carbon or chloroform; by this method .001 per cent. can be easily detected. For the determination of the quantity present the best results were yielded by evaporating with sodium carbonate, incinerating, extracting with water, acidulating, distilling with ferric chloride, and titrating with dilute volumetric thiosulphate solution.—Archiv. der Pharm., ccxxxii., 177.

Estimation of Iron Contained in Normal and Pathological Human Urine.—N. Damaskin. – Inaug. Dissert. Univ. Dorpat.

Lead in Urine—Detection of.—L. K. Frankel states that it is possible to detect 1 part of lead, dissolved in nitric acid, in 1,000,000 parts of water by means of the deposit of peroxide formed on a platinum electrode when the solution is electrolyzed. The presence of urine prevents this deposition of peroxide from the solution of the nitrate, and instead a deposit of lead is obtained on the negative electrode; but no deposit at all is obtained when urine containing lead that has passed through the animal system is electrolyzed, even when the current has passed sufficiently long to oxidize the scum and mucus which at first collects on the surface. Therefore, to test for lead in urine, the author oxidizes the organic matter with potassium chlorate and hydrochloric acid, and subsequently treats the solution with hydrogen sulphide.—Chem. News., 1893, 5.

Detection of Mercury in Urine.—S. Bondzynski.—In Ludwig's method the merçury is precipitated from the urine by zinc powder, and then volatilized in a glass tube. Commercial zinc powder, however, contains cadmium, from which it cannot be freed completely, even by prolonged and intense ignition in a stream of hydrogen. Nevertheless, even after ignition, it will, when only moderately heated in a tube, give off enough cadmium to form a mirror closely resembling mercury in appearance. Confirmation by means of iodine should, therefore, never be omitted; but it is safer to abandon the use of zinc, and to employ copper, in the form of powder, foil, or turnings.—Zeitschr. f. anal. Chem., 1893, 302.

The Recognition of Nitrites in Urine.—A. Yolles.—The reaction with dilute sulphuric acid and potassium iodide with starch paste is very sensitive in water, but in urine it is not sufficiently sensitive, since both normal and pathological constituents of urine take part in the absorption of iodine, and interfere with the reaction to a greater or less degree, and in the case of small traces entirely. The most suitable reagent for nitrites in urine is sulphanilic acid and α-naphthylamine sulphate. The lowest limit is 0.000032 Gm. N_2O_3 in 100 C.c. of urine. For the quantitative recognition of nitrites in urine, "Schäffer's test" (potassium ferrocyanide with acetic acid) is suitable. The lowest limit is 0.000045 Gm. N_2O_3 in 100 C.c. urine. For the quantitative determination the test in urine, according to Deventer's procedure, is unsuitable. For an approximate quantitative determination of nitrites in urine Trommsdorff's colorimetric method is exclusively available.—Zeitschr. f. anal. Chem., 1894, 762.

Total Nitrogen in Urine—Determination of.—C. Arnold and K. Wedenmeyer compared the time required for the complete decomposition of urine in Kjeldahl's process if they used a mixture of one part of potassium sulphate and 2 parts of sulphuric acid, or sulphuric acid with 1 Gm. each of mercury and copper sulphate, or the exclusive use of one of the latest additions. In all three cases was the oxidation equally rapid, but in the presence of potassium sulphate the frothing was stronger unless sulphuric acid was added in excess. The authors condemn the process of Schneider-Sugen as less convenient and less accurate.—Chem. News, 1893, 29; from Pflüger's Archiv., 1893.

Total Nitrogen in Urine.—Petit and Monfet decompose 10 C.c. of urine by Kjeldahl's method with 5 C.c. fuming sulphuric acid and a little mercury; then add water when the mixture is cold and colorless, neutralize with soda, acidify with a few drops of sulphuric acid, make up to 50 C.c., and determine the nitrogen with hypobromite in 10 C.c. of the liquid.—Alumni Jour. (N. Y.), 87.

Peptone in Urine.—Fifty C.c. of the urine are acidified with 5 C.c. of hydrochloric acid, and precipitated whilst warm with phosphotungstic acid. The supernatant liquid is decanted, and the precipitate, which is of a resinous nature, is washed with water twice, then treated with eight C.c. of water, and half a C.c. of soda solution (1.16), whereby the precipitate is dissolved; and the blue solution is warmed until a green turbidity is produced, and then allowed to cool, and a 1 per cent. solution of copper sulphate is added drop by drop. The presence of peptone is shown by a red coloration easily detected by filtering the liquid. The whole operation is finished in five minutes. If the urine contain mucin or albumen, these substances must be removed before testing.—Centralb. f. Med. Usch., 1894, No. 7.

——— Wesener offers the following tests (Chic. Med. Rec., 1894, 7). If the urine contains albumen or mucin these must first be removed. Albumen is removed as follows: To 50 C.c. of urine add 10 C.c. of a saturated solution of sodium acetate, and then a concentrated solution of ferric chloride, until a deep red color is produced. Now add potassium hydrate drop by drop, until neutral, then boil and filter; test a portion of the filtrate for albumen. Apply the acetic acid and potassium ferro-cyanide test. If albumen is found the filtrate must then be treated again with a little sodium acetate and ferric chloride solution, boiled and filtered. This is repeated until the test for albumen fails to react. The remaining filtrate, having been allowed to cool, is then treated for peptone by adding a few drops of sodium hydrate and two or three drops of cupric sulphate; this gives a purple color if peptone is present, and is known as the biuret test. A saturated solution of tannic acid gives a good reaction with peptone, but does not show traces that will be shown by the biuret test, and should any of the iron be left in the filtrate, it will form, with tannic acid, the tannate of iron, which would obscure any precipitate formed. The removal of albumen by this method has the advantage of also removing the greater part of the coloring matter from the urine.

Devoto commends the precipitation of albumen with crystals of ammonium sulphate. This takes more time, and, as regards the urine, has no advantage over the method given. If peptone is tested for in the blood or visceral fluids, Devoto's method should be used, as the results are more accurate.

Albuminous urine which has been decomposed cannot be tested for peptone, as some of the albumen has been converted into peptone and would give a reaction which would be of no clinical value, even though the albumen has been removed. This also applies to decomposed non-albuminous urine, since bacteria have an albuminous structure peculiar to themselves, which will react unless removed. Urine containing mucin appreciable with acetic acid must be freed from it. To 20 C.c. of urine add just enough lead acetate solution to produce a flocculent precipitate; an excess must be avoided; filter and test filtrate for peptone, using the biuret test. A simple method making a quantity estimation for peptone is as follows: To 10 C.c. of urine apply the biuret reaction; then dissolve a known quantity of peptone in 10 C.c. of normal urine, and apply the biuret test. Repeat the last operation until the colors are identical. Having a known strength of peptone for comparison, the amount of peptone can be estimated.

Sugar by Means of Fehling's Solution—Estimation of.—E. Nihoul. The cuprous oxide is most conveniently collected on a tared filter and weighed as such. The author finds that filters after being immersed in the alkaline copper solutions may be completely freed from copper by washing with water. Prolonged drying at 70–100° C. does not in the least increase the weight of the suboxide, but it is always contaminated with organic matter, and in accurate analyses an allowance of 0.3–0.4 per cent. should therefore be made. Cuprous oxide may be readily converted into cupric oxide by treatment with nitric acid and ignition. With care no loss will occur, Soxhlet's view that it volatilizes to a certain extent as oxynitrate being erroneous.—Chem. Zeit., 1893, 500.

Albumen and Sugar in Urine.—Bemo-Laquer. The clear filtered urine is heated to boiling, and a tenth of its volume of nitric acid added in one operation. If a flocculent and persistent precipitate forms, the urine is albuminous. To the clear solution, cooled and filtered if necessary, 10–20 drops of Almen's solution is added, and heated again for 1–2 minutes. Sugar is indicated by a dark-brown coloration. Almen's solution is prepared by dissolving 4 Gm. of Rochelle salt in 100 parts of a 10 per cent. solution of soda, and digesting this liquid with 2 Gm. of bismuth subnitrate until mostly dissolved. This solution indicates glucose more readily than Fehling's solution, and is not affected by uric acid or creatinine.—Jour. de Pharm. et de Chim., 1893, 134.

Glucose in Urine.—Small strips of a pure woolen fabric are impregnated with aqueous ten per cent. solution of stannous chloride and dried at a moderate temperature. If a few drops of the urine be placed upon such a prepared fabric and dried at a moderate temperature, or even over a burner, a dark coloration reveals the presence of glucose; by comparison with the colorations produced with glucose solutions of definite strengths approximately quantitative glucose determinations can be quickly made.—Bruno Bizzari, in Pharm. Post, 1894, 35.

——— 3–4 C.c. of a sugar solution boiled for one minute with 0.12 Gm. iodic acid and 0.2–0.4 Gm. sodium hydrate, allowed to cool, acidified with dilute hydrochloric acid and ammonium hydrate added so as to form a layer, will cause a dark precipitate, a combination of nitrogen and iodine. This test is characteristic for glucose and is not given by ketones and aldehydes in general; the test may be useful in the examination of urine for sugar, as normal urine does not give the reaction.—A. Jaworowsky, in Pharm. Post, 1893, 549.

——— Guirini recommends (Jour. de Pharm. d'Anvers; Montreal Pharm. Jour., 1894, 53,) a solution of propionic acid (2 per cent.) in the official solution of soda of the Austrian Pharmacopœia. When ten drops of the suspected urine are poured into 5 C.c. of this solution, and the mixture boiled for 30 seconds, the color changes to a deep blue in the presence of even one-tenth per cent. of sugar, normal urine being colored green. The reaction is based on the fact that propionic acid is reduced to indigo in the presence of sugar at the boiling point.

Sugar in Urine—Methylene Blue as a Reagent for.—One C.c. of the urine, previously diluted to ten times its volume, is mixed with 1 C.c. of methylene blue solution (1 Gm. per litre) and 1 C.c. of normal potassium hydrate solution in a test tube; the mixture is diluted with 2 C.c. of water and heated over a flame. The methylene blue will be completely decolorized if the original urine contains upwards of 0.05 per cent. of sugar. If the color remains permanent the urine cannot be called diabetic.—N. Wender, in Pharm. Post, 1893, 393.

Checking Fehling's Solution.—A. Bornträger has come to the conclusion that the standard solution of invert sugar used to check the Fehling solution should be prepared at the ordinary temperature. Pure saccharose is easily prepared by precipitating a filtered concentrated solution of sugar candy with alcohol and drying the precipitate. 19 Gm. of this product is dissolved in dilute hydrochloric acid, containing 4.5 per cent. of HCl in a 100 C.c. flask. After standing over night, 25 C.c. is pipetted off, colored with a little litmus, exactly neutralized with alkali, and made up to 1 litre. This solution contains 0.3 per cent. of invert sugar.—Zeitschr. f. angew. Chem., 1893, 600.

A Reducing Substance in the Urine of Enuresis.—F. Rohde almost always found in the urine of children suffering from enuresis a reducing substance which is not sugar, and which he takes to be lactic acid. The same was also noted in the urine of adults who complained of excessive micturition.—Berlin Klin. Woch.; Amer. Drug. and Pharm. Rec., 1893, 220.

Sugar in Urine—Detection of.—C. Kistermann (Deutsch. Archiv. fur Klin. Medicin., L., 423). For the application of the phenylhydrazin test, the author dilutes with five volumes of water.

Polariscope Tests for Sugar in Urine.—Diabetic urine sometimes contains substances which act on polarized light so as to invalidate the results derived from the above method of investigation. Among them M. Jolles (Journ. de Méd. de Paris) enumerates glycosuric acid, dextrogyrate lactose, lævogyrate oxybutyric acid, levulose, and certain drugs, such as benzosol, which have been employed in diabetes. He cites a case in which this disease was considered to have been cured by benzosol, because the urine gave no polarization, and yet 10 Gm. of sugar to the liter were afterward found in the same urine when tested chemically.—Drug. Circ., 1893, 204.

Absence of Sugar from Normal Urine.—G. S. Johnson points out that all human urines exercise some reducing power over cupric salts in boiling alkaline solutions. This fact is particularly well marked in normal non-saccharine urines, if of high specific gravity, because such urines, being highly concentrated, are richer in the normal reducing agents, and are the more likely to be pronounced saccharine. He expressed his agreement with Pavy's assertion that one-fourth of the reducing action of the normal non-saccharine human urine is attributable to uric acid. He had found, however, that by separating the creatinin from the urine by a method not hitherto described, the urine is deprived of its reducing power. The method in question is the precipitation by means of mercuric chloride, which effects the complete removal of the creatinin from the unconcentrated secretion by fractional precipitation. The careful estimation of the amount of creatinin present, together with an accurate estimation of the reducing power of the creatinin itself, fully accounts for the reducing power of the original secretion. He then demonstrated the test employed by Schwartz in confirmation of his view that normal human urine is absolutely non-saccharine. It is as follows: The urine is completely precipitated with lead acetate and filtered. The filtrate is rendered alkaline with potash, and a solution of phenylhydrazin is added. The mixture is well shaken and boiled. An orange color is developed, which is followed by an orange precipitate, when excess of acetic acid is added, if sugar be present. Schwartz states, and the author has confirmed his statement, that normal urines gives a negative result with this test. He concludes, therefore, that sugar is absent from normal urine.—Ibid., 177.

Foetal Urine.—T. A. Helme. The presence of urea in the amniotic fluid has been generally attributed to foetal urine, but no direct proof that foetal urine contains urea has hitherto been forthcoming. In the present instance, a small quantity was accidentally obtained during delivery; and the following is the analysis made, comparative experiments being performed with the urine secreted shortly after birth:

The foetal urine contained no sugar, albumen, phosphates, or sulphates. Urea (0.15 per cent.), kreatinin, and chlorides, were present. Eight hours after birth, sugar, albumen, and phosphates were absent, but sulphates, chlorides, kreatinin (in larger amount), and urea (0.3 per cent.) were present.—Brit. Med. Jour., 1893, i., 1261–1262.

Sensitive Test for Tannic Acid in Urine.—Rosin uses a dilute tr. iodi made by diluting 10 C.c. of the official tincture with 100 C.c. alcohol. A few C.c. of this solution are added to the urine so as to form a layer. If the urine contains tannin, the separating layer will be colored in one minute greenish, which color is often retained for an hour.—Apoth. Zeit., 1893, 641.

Some Preliminary Remarks on the Mechanism of the Disassimilation of the Albuminoids and the Formation of Urea in the Economy—A. Gantier. With the exception of urea and corresponding nitrogenous bodies directly eliminated in the urine, the products of the direct disintegration of the albuminoids of the protoplasms (glycogen, sugar, fats,) are then submitted to oxidation. In the muscles the carbohydrates and the fats are destroyed by fermentation and oxidation. The fatty acids pass into the blood, and are there burnt by successive stages; but we may say that this second phase of disassimilation, a phase essentially oxidizing, reaches only the products derived from the direct activity of the protoplasm, and takes place, so to speak, at the periphery of the cellule, and not in its essentially active protoplasmic part, which is almost everywhere reductive. He does not hesitate to affirm that in the liver and in other organs this fermentive and anaërobic splitting up of the albuminoids must be accompanied with the formation of very reductive and highly poisonous compounds (toxines, extractives, ptomaines, coloring matters), as experience shows, but even with the production of free hydrogen. Grehant has just announced that in his analyses of the normal blood of animals he has always found a certain quantity of free hydrogen, which has hitherto been confounded with nitrogen.—Compt. Rend., cxviii., No. 17.

Experimental Researches on the Place of the Formation of Urea in the Animal System—Preponderance of the Liver in this Formation.—M. Kauffmann shows that the formation of urea is not entirely confined to the liver, as all the tissues produce a certain quantity. Still the liver must be regarded as the most active focus of the production of urea in the animal when fasting. The production of urea seems thus at once connected with the phenomena of nutrition effected in the tissues, and with the phenomena of elaboration and of the preparation of nutrient materials poured into the blood by the hepatic gland.—Compt. Rend., cxviii, No. 17.

Formation of Uric Acid.—G. Salomon. In relation to Horbaczewki's work on uric acid the author advances a claim of priority.—Virchow's Archiv., cxxxii., 370; Jour. Chem. Soc. (Abs.), 1893, 428.

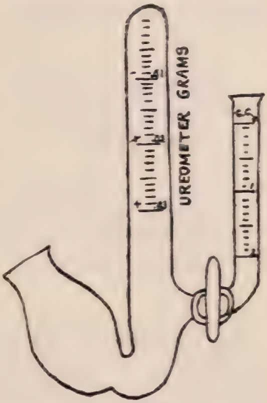
Hüfner's Method of Estimating Urea.—W. Camerer. It is urged that this method of estimating urea is of sufficient accuracy for all purposes. There are certain points of detail to be attended to which are pointed out. Among the facts noted may be mentioned the following: The alkaline solution need not be absolutely fresh for every estimation; keeping for 24 hours makes only a very small difference in the result. The yield of nitrogen from urine is slightly greater when sugar is added, but not sufficient to account for the increase of urea found in diabetes.—Zeit. Biol., 1893, 239; Jour. Chem. Soc. (Abs.), 1893, 560.

Estimation of Uric Acid—Behavior of Uric Acid in Solution.—I. Kreidl. To the solution of uric acid, a moderate excess of (normal) potash solution is added, and then a considerable excess of $\frac{n}{30}$ iodine solution; after standing for three-quarters of an hour, the solution is acidified with hydrochloric acid. The excess of iodine then separates, and is titrated with $\frac{n}{30}$ thiosulphate, starch being used as an indicator; 3.5 atoms of iodine correspond to 1 mol. of uric acid under these circumstances, and 2.3 of the hydrochloric acid is added immediately after the iodine solution. A solution of uric acid, and still more one of potassium urate, when allowed to remain in contact with air, gradually loses its power of reducing iodine solution; but this is due to the presence of microbes, for a sterilized aqueous solution of uric acid does not undergo this change in a sterilized atmosphere; potassium urate does not, however, if the solution is boiled, or if a slight excess of potash is present.—Monatsh. f. Chem., 1893, 109; Jour. Chem. Soc. (Abs.), 1893, 558.

Uric Acid and Xanthin Substances in Urine—Determination of.—W. Camerer's (Zeitschr. f. analyt. Chem., 1893, 633) proposed method yields approximately the same values as Haycraft's process.

Modified Doremus Urinometer.—J. J. D. Hinds (Chem. and Drug., 1894, 738), consists of a tube, graduated to tenths of cubic centimeters, attached as shown. The instrument is filled with the test-fluid in the usual way, and then the small tube is filled with the urine. Exactly 1 C.c. is allowed to run in through the stop-cock, and the evolved nitrogen is measured in the larger tube. The instrument gives as great accuracy as can be attained with the small quantities dealt with. The advantages claimed for it over the ordinary urinometers are that the urine is more accurately measured and that no bubbles of nitrogen can escape. The solution which is used to decompose the urea is a 40 per cent. solution of sodium hydrate. Twenty C.c. are sufficient for a test. This quantity is put into a test-tube or beaker, and about 1 C.c. of bromine added with a small nipple pipette. When the bromine has disappeared, dilute until the quantity is sufficient to fill the urinometer. The instrument is empirically graduated so as to indicate milligrammes of urea to the C.c. of urine, or grains to the fluid ounce.

FIG. 39.



Modified Doremus Urinometer.

Home-made Urinometer for 25 Cents.—F. T. Green, in Pacific Drug., 1894, 17.

Rapid Estimation of Urea.—E. Riegler (Zeitschr. f. anal. Chem., 1894, 49), proposes to use Millon's reagent in a rapid and easy method for the determination of urea in the following manner: Take a test tube about 140 mm. long by 20 mm. interior diameter. Close with an air-tight cork perforated by two holes. In one of these holes place the tube of a funnel provided with a stopcock. In the other perforation place a glass tube through which the test tube may be connected either with a Knop-Wagner nitrometer or with some other apparatus for the collection of gases. The tube of the funnel must reach 15 mm. below the stopper, while the other tube should not extend below the cock at all. Now with a pipette put exactly one C.c. of the solution of urea in the test tube. Then stop up the test tube by turning off the stop-cock, and put the tube into a beaker of the same height as the test tube and containing about a litre of water at the ordinary room temperature. After 5 or 10 minutes adjust the water level in the burette at zero, and turn off the glass stop-cock carefully, and then introduce exactly 2 C.c. and 4 or 5 drops of Millon's reagent into the funnel. The tube of the funnel may be marked at the right point, so that it will be unnecessary to measure the reagent each time the operation is repeated.

Uric Acid Estimation.—Process of Arthaud and Butte (Rép. de Pharm., 1894).—100 Gms. of the urine are taken, and carbonate of soda added to precipitate the phosphates and to dissolve any precipitated uric acid. It is best to operate with warm solutions. Half of the filtered liquid is taken for the estimation. The two following solutions are prepared:

A.

Sulphate of copper	14.84 Gm.
Tartaric acid	traces.
Distilled water	1000 Gm.

B.

Sodium hyposulphite	80 Gm.
Rochelle salt	160 Gm.
Distilled water	1000 Gm.
Phenol	traces.

For estimation, two parts of solution A are mixed with eight parts of B, which gives a solution containing a known quantity of copper hyposulphite, of which 10 C.c. precipitate exactly 2 centigrammes of uric acid. To effect the precipitation, 50 C.c. of the filtered urine is titrated gradually with the copper solution. To determine the end reaction, it is necessary to filter a few drops of the mixed liquids until the point arrives when the filtrate gives no precipitate with more copper solution. It is also important to see that no excess of copper has been added. The calculation is then simple.

Estimation of Uric Acid.—P. Ducong uses for this purpose a modification of Arthaud and Butte's copper hyposulphite test. Since the cupric hyposulphite solution is very alterable, the author prepares the following solutions, which, separately, are permanent:

Solution 1.—Pure crystallized copper sulphate, 4.47 Gm.; sulphuric acid, 5 drops; diluted with distilled water, to 1000 C.c.

Solution 2.—Hyposulphite of sodium, 45 Gm.; potassium sodium tartrate, 45 Gm.; diluted to 1000 C.c. with distilled water.

Every 10 C.c. of a mixture of equal parts of these two solutions employed indicate 1 Cgm. of uric acid per litre of urine examined. The reaction takes place according to the formula:

$$S_2O_3Cu + C_5H_2N_4O_3Na_2 = S_2O_3Na_2 + C_5H_2N_4O_3Cu.$$

—L'Union Pharm., 1893, 329; Amer. Jour. Pharm., 1893, 453.

Detection of Uric Acid in the Organs.—The methods of quantitatively estimating uric acid by precipitating it with hydrochloric acid, have always had the disadvantage of producing xanthin at the same time. To ascertain the presence of xanthin, it is now suggested [Ber d. Chem. Ges., 1893 (Rep.), 449] to heat the mixture with concentrated nitric acid until gas ceases to be evolved. By this means the uric acid is oxidized, while the xanthin remains unchanged. The acid solution is treated with a slight excess of ammonia, heated after a short time on the water-bath, acidulated with acetic acid, and mixed with an equal volume of alcohol. By this method, it is said to be possible to detect 5 milligrammes of xanthin in 1 Gm. of uric acid, or 1 part in 200.

Tetraethyl-Ammonium.—This is claimed by F. Peterson to be one of the best solvents for uric acid, and may be obtained by decomposing tetraethyl-ammonium sulphate by barium or its iodide by silver. It occurs in deliquescent needles, and absorbs carbon dioxide from the air. It is strongly alkaline and saponifies fats. It is as bitter as quinine. It has a caustic action upon the epidermis, and an unctuous, alkaline feel when rubbed between the fingers. Its formula is $N(C_2H_5)_4OH$. It is not decomposed by the galvanic current. It forms numerous salts, simple and double.—West. Drug., 1894, Jan.

Urobilin.—A. Eickholz. Normal urobilin exists in the urine totally or partially as chromogen, and can by approximate methods be isolated so as to furnish a solution containing the pigment wholly or partially as chromogen. Urobilin and urochromogen are not highly colored, and the urine cannot depend on them to any great extent for its color. Pathological urine contains an additional pigment, pathological urobilin with a different absorption spectrum ; it also can be isolated as a chromogen. Both urobilins can be reduced by sodium amalgam, but the reduction product differs from urochromogen, and may be termed urobidinogen. On prolonged reduction, bilirubin furnishes a substance resembling urobilin. Maly's hydrobilirubin is an intermediate product in the reduction. Haematin in acid solution is reduced to a substance closely resembling urobilin. Incomplete reduction furnishes a substance also resembling urobilin, but which immediately reverts to the state of urohaematoporphyrin on standing.—Jour. physiol., xiv., 326–339.

——— F. Grimm. In the fasting condition, normal urine contains no urobilin. At the conclusion of gastric digestion, a larger or smaller quantity appears. Any great amount of the pigment is, however, a pathological condition, the most important cause being the circulation of unorganized blood pigment in the vessels, as after a haematoma. In nephritis, it also occurs. A large number of cases illustrating the presence of urobilinuria in various diseases are given fully.—Virchow's Archiv., cxxxii., 246–289 ; Jour. Chem. Soc., (Abs.) 1893, 429.

Estimation of Urobilin in Urine.—A. Studensky.—The process consists in extracting the urobilin by means of chloroform, in the presence of copper-sulphate and ammonium-sulphate, and in the colorometric comparison of the colored chloroform solution of urobilin with standard solutions.—Chem. Central, 1893, 668; from St. Petersburger med. Woch., 1893, 283.

Xanthin Derivatives.—P. Balke.—The behavior of xanthin derivatives with Fehling's solution in the presence of hydroxylamine-hydrochloride, as a reducing agent, has been examined. The precipitates obtained in this way with guanin and xanthin are at first white, but speedily become green by oxidation, so that when analyzed they show a composition intermediate between a cuprous oxide and a cupric oxide compound. There is sufficient evidence, however, to justify the view that the white precipitate is a compound of equal molecular proportions of the base and cuprous oxide. Heteroxanthin and paraxanthin, prepared from urine by Salomon's process, detailed in the paper, give similar white precipitates. Theobromine and caffeine are the only known xanthin derivatives which do not give precipitates by the above reaction. The uric acid precipitate, $C_5H_4N_4O_3,Cu_2O$, is yellowish-white at first, but speedily becomes greenish; the carmine precipitate, $C_7H_8N_4O_3,Cu_2O$, is liable to be mixed with uncombined cuprous oxide which colors it yellow. The adenin and hypoxanthin precipitates are white.

The author proposes to take advantage of the great insolubility of these cuprous oxide compounds for the titration of xanthin derivatives, as has, indeed, been already done for the titration of uric acid. To an alkaline solution of the xanthin derivative, a few cubic centimetres of a solution of hydroxylamine hydrochloride are added, and then Fehling's solution is run in gradually from a burette, the liquid being constantly agitated until the yellow or yellowish-red color of cuprous oxide makes its appearance, indicating that all the xanthin derivaties have been precipitated. A short interval should be allowed to elapse between each addition of the Fehling's solution, as the separation of the precipitate (or of cuprous oxide) is not very rapid. The results are calculated on the basis that 1 mol. of the derivative is equivalent to 2 atoms of copper; they are not trustworthy for solutions containing less than 1 per cent.

As a means of separating the xanthin derivatives from flesh, the production of the cuprous oxide precipitate compares very favorably with Neubauer's method; a description of how it may be applied is given. A process is also described for extracting the xanthin derivatives from plants, particularly malt sprouts, by means of this reaction.

The reason why very small quantities of sugar in urine are liable to escape detection by the reduction test is the fact that as soon as the cuprous oxide is produced in the hot liquid it combines with xanthin derivatives present, and is no longer recognizable as cuprous oxide. Protamine, the base isolated by Miescher, gives the biuret reaction with sodium hydroxide and copper sulphate, but in the presence of hydroxylamine hydrochloride a yellow precipitate is obtained which has all the characteristics of a cuprous oxide compound, and yields the original base when treated with hydrogen and sulphide. It must be admitted, therefore, that protamine is an individual compound. The paper concludes with a table exhibiting the reactions of the xanthin derivatives.—Jour. f. prakt. Chem., xlvii., 537–567.

Episarkin.—G. Salomon has recently described under this name a new xanthin-like compound in the urine. It appears to be identical with a substance of hitherto doubtful nature, described by the author at various times, in the urine of the pig and ox, and in the urine of leucæmic patients. Further details are promised.—Zeitschr. physiol. Chem., 1893, 207.

Urine and Sputum—Chemical and Microscopical Examination of.—E. J. Millard points out some of the abnormal features of these subjects elucidated by the recent advances and discoveries in physiological chemistry. In this paper are included the following: I. Urine; color, reaction, albuminuria, glycosuria, urea, uric acid, urinary sediments, mucus, casts, cylindroids. II. Sputum in bronchitis, pneumonia, phthisis.—Pharm. Jour. Trans., 1893, 533.

BACTERIOLOGY.

Bacteriology.—For progress in bacteriological investigations in full, reference must be made to Centralbl. f. Bacteriol.; Ann. de l'Institut Pasteur; Arch. f. Hygiene, Chem. Zeit. [especially Chem. Zeit. (Rep.)], Bull. thérap.; Rev. d'hygiene et de police sanitaire; Zeitsch. Biolog.; D. med. Wochenschr.; Berl. klin. Wochenschr., and others.

Bacteriology for Pharmacists.—Illustrated article on the use of the microscope in bacteriological work.—Pharm. Jour. Trans., 1893, 101.

Bacteria, their Nature and Function.—A lecture by E. Klein.—Pharm. Jour. Trans., 1893, 15, 35.

Bacteria—Chemistry of.—R. Warrington.—Pharm. Jour. Trans., 1893, 402; from Chem. News, 183; Reprinted in Pharm. Era, 1894, 104.

Bacteriological Culture Apparatus.—W. H. Lymons, in Pharm. Jour. Trans.; Reprinted in Nat. Drug., 1893, 173.

Culture Tubes—Inoculating.—Beneke recommends that gelatin culture tubes should be inoculated by making a puncture quite at the side of the medium, close to the glass. Examination may be made from the outside. —Centralb. f. Bakt., through B. M. G. Epit., 48; Pharm. Jour. Trans., 1893, 263.

Incoagulable Albumen.—This culture medium for bacteria is prepared by E. Machal by adding a solution of ferrous sulphate (1 in 1000) to a filtered solution of fresh egg albumen in distilled water. To a 5 per cent. solution of albumen add 5 C.c. of ferrous sulphate solution. The salt prevents coagulation on heating, and the mixture can be at once sterilized in an oven at 115°. The medium has a slight alkaline reaction. In use it replaces the ordinary bouillons.—Bull. Soc. Belge Micr., xix., 64; Pharm. Jour. Trans., 1893, 263.

Formalin and Gelatin.—C. Gegner some months ago pointed out that not only do formalin solutions exercise a bactericidal action, but formalin vapor is powerfully antiseptic and affects the melting of gelatin exposed to it. G. Hauser, referring to this communication, shows that such gelatin cannot be liquefied, even by the heat of a Bunsen flame or on boiling in soda solution. Being strongly antiseptic, too, no organisms will grow upon it. He takes advantage of these peculiarities in preparing colonies of bacteria for microscopic examination. A thin film of gelatin, in which a particular growth is present, is placed on a glass slide, covered with thin glass, and the cover sealed by a ring of melted gelatin. The preparation is then exposed to formalin vapor for twenty-four hours, after which the gelatin is quite solid and unalterable. By previously immersing the gelatin film in weak aqueous fuchsine solution, the bacteria are stained sufficiently to contrast with the surrounding medium, which is much more faintly colored.—Münch. Med. Woch., xl., 599 and 655.

Highly Resistive Germs in Gelatin.—Heim (Centralbl. f. Bakt.) draws attention to the hitherto unpublished fact that spores, exceedingly difficult to destroy, sometimes occur in gelatin ordinarily employed in the preparation of culture media. He observed that a great number of gelatin tubes, prepared and sterilized as usual, became spoiled by the growth of yellow colonies, which proved to be composed of spore-containing bacteria. Contamination from all other sources was carefully excluded, and traced definitely to the gelatin by an experiment which consisted in dissolving some of the suspected material in sterilized broth and exposing the latter to steam for one hour, a procedure which experience shows to be effective in the destruction of ordinary germs. The broth was then kept in the incubator, and on the following day showed definite growth. This experiment was repeated several times with the same result. Further investigation showed that an exposure to free steam of six hours' duration was necessary to destroy the spores of these bacteria. Fifteen minutes, however, sufficed when compressed steam (1 atmosphere) was employed. The characteristics of these organisms are being further investigated.

Killing and Staining Infusoria.—F. L. James (Nat. Drug., 1893, 96) has found that tinctures of perchloride of iron added to the liquid containing the organisms kills them instantly, and leaves them in an extended condition. But a few drops of the tincture are necessary to kill all the infusoria in a pint of water. After the iron is added let the vessel remain in a quiet place for a short time, or until the liquid settles. The infusoria will be found in the sediment. Draw off the supernatant water until but a small amount is left over the sediment, then add fresh distilled water and wash the sediment thoroughly. Let stand until the sediment again falls, draw off the water, and wash the residue with alcohol. A few drops of a solution of gallic acid added to the alcohol will stain the infusoria a dark blue or bluish-black. The stained specimens can be examined at once in glycerin, or may be mounted in balsam by the usual processes.

Rapid and Perfect Staining of Gonococci.—Lanz suggests the following: Spread the secretion on cover-glass and fix by heat. Then place in a 20 per cent. aqueous solution of trichloracetic acid, leave here for 30 seconds to one minute. Then rinse slightly in clear water, renew superfluous moisture by bibulous paper. Pass the cover-glass through flame 2 or 3 times to fix secretion. It is then floated, with surface downward, on a methyl blue solution prepared as follows: Mix 30 C.c. of distilled water and 1 or 2 drops of KOH, and add saturated alcoholic solution of methyl-blue until the mixture assumes a dark blue color. Leave the cover-glass in contact with this solution from 2 to 5 minutes, remove, rinse well and dry. Mount in balsam or dammar, or examine in glycerin.—Nat. Drug. 1894, 187; from Apoth. Zeit., 1894.

Distinction Between Living and Dead Bacteria.—Living bacteria will liberate oxygen from peroxide of hydrogen, but bacteria which have been killed by heat will not. Certain proteids which are now living also have this property. The reaction has been proposed as a microscopic test for the presence of bacteria in water, etc.—New Eng. Drug., 1894, 170.

Cilia of Bacteria—Estimation of.—Nicholle and Morax recommend a modification of Lœffler's method.—Ann. de l'inst. Pasteur, vii., 554; Pharm. Jour. Trans., 1893, 263.

Formation of Coloring Matters by Microbes.—A new process, due to G. Sencier, consists in abstracting from chromogenic bacteria and microbes or all analogous micro-organisms, the coloring matters which they either contain or are capable of producing under appropriate conditions, as well as the by-products which are cultivated in the course of their cultivation. The invention includes suitable apparatus for carrying out the suggested process on an industrial scale.

The arrangement will be something like the following: In a mixing vessel provided with mechanical agitator the nutritive liquor required for the nourishment of the microbes which it is desired to cultivate is prepared. This nutritive liquid is run or is pumped into a sterilizing apparatus in which it is subjected to a temperature of 115° C. for a quarter of an hour to ensure complete sterilization. The liquid is next transferred to the cultivating vats, *i. e.*, into vats the contents of which have been inoculated with the bacilli which it is desired to propagate, sterlized air being admitted in cases where this is favorable to the maximum development of the chromogenic properties of the bacilli. When a sufficiently large growth has been obtained, the contents of the cultivating vats are run into others beneath, and from these transferred to a monjetus, whence the microbes are separated from the liquor by forcing, by means of compressed air, through filters. The microbes collected on the filters are washed and then treated with such chemical agents as are required to abstract the coloring matter they contain. It is to be remarked that the air coming from the cultivating vessels (which are kept carefully closed) carries away with it a certain quantity of gaseous products whose formation generally accompanies the development of microbes, and that it is important to collect them where utilizable, which is done by chemical or physical means, as may be most suitable according to the nature of the bodies to be dealt with (Revue de Chem. Indust.).—Montreal Pharm. Jour., 1894, 31.

New Researches on the Influence of Bacterian Associations—Heightened Virulence of Some Microbia—Increased Susceptibility.—V. Galtier's conclusions are: 1. Microbia, attenuated so far that that they can no longer produce a fatal malady if alone, may be intensified and rendered virulent if two species are introduced into an organism. 2. The two microbia may flourish side by side, but in general one of them tends to disappear, whilst its companion becomes virulent again. 3. If two microbian species are associated, sometimes the one and sometimes the other recovers its virulence according to the manner of their introduction or according to the species experimented upon. 4. Bacterian associations may be utilized in laboratories to obtain in attenuated microbia a return to virulence. 5. They may not only explain the revival of certain epidemics, but they may aggravate the effects of inoculation made with a benign virus. 6. We may foresee that the introduction of a microbe, which confers immunity against a given malady, may increase the susceptibility for another.—Compt. Rend., cxviii., No. 18.

Toxins and Antitoxins.—It is stated by Kanthack, in the Medical Chronicle, that the specific action of pathogenic bacteria has been shown, during the past few years, to be due to toxalbumins instead of ptomaines or poisonous bases, as was formerly supposed, and it was assumed that these toxalbumins were formed from albuminous substances existing in the body, as a result of the activity of bacteria. They are considered by Buchner (Münch. med. Wochen.), however, to be direct products of bacterial cells, and he has proved this in the case of tetanus, by growing the bacillus on a solution of asparagin. Since asparagin cultures produced the typical tetanic lesion in animals, it seemed clear that the toxalbumin formed must have been derived directly from the bacterial plasma. Though no toxalbumins have yet been separated in a pure state, they are known to react like the enzymes and so-called alexins or protective proteids. In a moist condition, they are generally destroyed by a temperature of 55° C. to 70° C., though resisting much higher temperatures when in a dry state, whilst neutral salts, such as the sulphates of alkaline bases, which limit the action of water, will also increase the resistance. Buchner further suggests that antitoxins, as well as toxins, are probably bacterial products. Antitoxins act by establishing in animals immunity to specific diseases. They appear to remain stored up in the organism after the toxins have been rendered harmless, even when administered in the exact proportion to effect neutralization of the latter. Probably, therefore, toxins and antitoxins do not react directly on each other, and the latter, acting by immunization, have no direct curative action.—Pharm. Jour. Trans., 1893, 352.

Phagocytosis.—H. C. Ernst reviews this subject especially as strengthened by the volume upon "La Pathologie Comparée de l' Inflammation," being the lectures of Metschnikoff. The theory of *phagocytosis* is simply this—that in many of the processes that follow the introduction of bacteria into living tissues, certain cells of the fluid and solid tissues of the body act as actual phagocytes; they possess the property of collecting about the invaded region and of englobing and destroying, by absorption, the living bacteria, that without their interference would flourish, gain access to the other portions of the organism, and produce an attack of an infectious disease.—Boston Med. and Surg. Rep.; Pharm. Jour. Trans., 1893, 306, 383.

Bacteria and Calculi.—Gallipe (Compt. Rend., cxvi., 1085), in 1886, suggested that certain microbes found in calculous deposits and secretions formed within the human body, were not accidentally present. They preserved their vitality for several years, and could be isolated and cultivated. At a later period he instituted a series of experiments, and found that in normal saliva saturated with carbonic acid, a considerable number of small concretions of variable density were formed in the course of years. He has now been able to satisfy himself that these resulted from the precipitation of salts consequent on decomposition set up by micro-organisms found within the concretions.—See (Brit. Med. Jour.) Pharm. Jour., Trans., 1893, 85.

Pathogenic Bacteria in Plant Tissues.—H. L. Russell (Johns Hopkins Hosp. Rep., concludes that a considerable number of different species of pathogenic and non-pathogenic bacteria can withstand the action of the living plant organism for a considerable length of time.—Pharm. Jour. Trans., 1893, 231.

Pyocyanic Bacillus—Influence of Atmospheric Agents, Especially Light and Cold.—D'Arsonval and Chavrin. The bactericide influence of light is not distinct when we direct upon the bacteria either the solar spectrum or that of the arc. Microbia support low temperatures very well. Some species have been observed in ice, snow, hail, etc. This resistance explains winter epidemics. The pyocyanic bacillus under the influence of cold promptly loses its pigmentary properties; but for its destruction we require temperatures of —40° to —60°.—Compt. Rend., cxviii., No. 3.

Antitoxins.—H. Aronshon prepares antitoxins of high activity by precipitating them from solutions by means of albuminous hydrate, filtering, shaking the precipitate with dilute alkalies, filtering and evaporating in vacuo.—Berl. Klin. Wochenschr.; Chem. Zeit. (Rep.), 1894, 133.

Microbes in Disease.—V. Galtier finds that pathogenic microbes, such as bacillus anthracis, Streptococcus pneumoenteritis equi, etc., when attenuated until no longer capable of causing death, may have their energy renewed and become virulent again when two separate species are introduced into the same organism together.—Comp. rend. 1894, 1001.

The Nucleins and Nuclein Therapy.—V. C. Vaughan.—Reprinted in Amer. Drug. and Pharm. Rec., 1893, 347.

Microbes and Sewer Air.—J. Parry Laws has made an investigation of sewer air for the London County Council, and reports that the microorganisms of sewer-air are generally fewer than in the free air in the immediate vicinity of the sewer, and also that those found in the sewer air are related to the fresh air, and not to the sewage species.—Amer. Therap., 1894, 279.

Microbes and Arrow Poison.—Le Dantec has examined the arrow poison used by the natives of the New Hebrides. The results of his investigation have been published in the "Annals de l'Institut Pasteur." The New Hebrideans employ for this purpose earth from marshy places; it contains both the septic vibrio and the tetanus bacillus. From experiments on animals, it was found that when the poison was old, they died from tetanus; when fresh, from septicæmia.—Amer. Therap., 1893, 160.

Electricity and Microbes.—D'Arsonval and Chavrin recently made some investigations as to the effects produced on microbes by the electric current, selecting for this purpose the Bacillus pyocyaneus. A culture of this organism was placed in an apparatus by which the current could be passed through it. At the commencement of the experiment a tube of nutrient agar-agar was inoculated with two drops of the culture. After the lapse of ten, twenty and sixty minutes, respectively, further cultures were made in different tubes, which were all placed in an incubator for some hours. An examination of the tubes then showed that a luxuriant culture of the bacillus had grown in each; the forms of the colonies had undergone no change and were similar to those grown in control tubes: the pathological characteristics appeared also to be the same. The color of the cultures, however, had been to some extent affected; for while in the first two tubes the organisms exhibited an intensely green color, which was scarcely less vivid in the second than in the first tube, the color in the third and fourth tubes was much less marked. These experiments seemed to show that the electric current had some effect upon the organisms, although the action was not very marked. Further investigations in the same direction would be valuable, and might possibly throw some light on the electrical state of the atmosphere as affecting the course of certain epidemics.—Drug. Circ., 1894, 10.

The Synthetic Powers of Micro-Organisms.—By O. Loew. Among all living organisms the micro-organisms micrococci, as well as bacteria, bacilli, and spirilli, are especially remarkable for their intensity of chemical activity. Oxidations and decompositions, reductions and synthetical processes, are effected on an extensive scale. If we consider the destructive and the synthetical operations, we must arrive at the conclusion that the former are necessary for carrying on the latter. The former yield not only the forces necessary for the synthetical work, but also the suitable atonic groups. It is certainly a highly interesting question of physiological chemistry to study the relations of the two different directions, and to elucidate which are the groups that serve for the synthetic work. We must first consider the chemical structure of the compounds that can serve as nutrients, we must investigate the causes that bring about the transformation of potential into actual energy, and we must recognize above all that the proteids of the living protoplasm are chemically distinct from those of the dead. We must acknowledge that when the labile character of the former changes by atomic migrations into a stable one the death of the cells has come.

Nutritive and poisonous qualities are relative conceptions. Poisons may become nutrients for bacteria when highly diluted, as phenol or acetic ether, and nutrients may become unfit for nutrition if the concentration reaches certain limits. Small chemical changes may convert a nutrient substance into a poison, and, again, the poison into an indifferent substance. As albuminous matter contains carbon, hydrogen, nitrogen, sulphur, and oxygen, we have to consider principally the question, which substances are suitable sources for the carbon, which for the nitrogen, which for the sulphur. Experiments lead to the following conclusions:

1. As sources of carbon can be used in neutral or feebly alkaline solutions, alcohols, phenols, organic acids, ketones, aldehydes, carbohydrates, ethers and esters, many alkaloids.

2. As sources of nitrogen can serve: ammonium salts, nitriles, amido-acids, amines, ureas, guanidines, alkaloids, nitrates, and nitrites.

3. As sources of sulphur may serve; sulphates, sulphites, hyposulphites, sulpho-acids, mercaptans, sulphones.

The nucleins, which contain phosphoric acid in their molecule, are left out of consideration. The following conclusions are drawn for most of the non-pathogenic microbia:

1. Hydroxylated acids are better than the corresponding non-hydroxylated ones, *e. g.*, lactic acid is better than propionic acid.

2. Polyvalent alcohols are more favorable for the development than the corresponding monovalent alcohols, *e. g.*, glycerin is better than propylic alcohol.

3. The nutritive quality of the fatty acids and monovalent alcohols de-

creases with the increase of the number of carbon atoms in their molecules. Thus acetic acid is better than butyric acid.

4. The entrance of aldehyde or ketone groups increases the nutritive properties; glucose is better than mannite.

5. The author has observed neither nutritious nor poisonous properties in picro-nitric acid, chloral hydrate, pinakon, ethylenediamine, glyoxal, amido-acetal. Aceto-oxime, diacetonamine, and maleinic acid are very poor nutrients. According to B. Meyer, mesaconic, citraconic, paramethyl-succinic, dimethyl-succinic, and benzoyl-succinic acids are not capable of serving as food.

6. The poisonous properties are determined by the energy with which the unstable atoms of the living protoplasm are attacked.—Central-Blatt f. Bacteriologie; Chem. News, 1894, 90.

The Probable Destruction of Bacteria in Polluted River Water by Infusoria.—D. Harvey Attfeld. From experiments it would seem that infusoria have some powerful influence in getting rid of bacteria, and possibly in aiding in the self-purification of water.—Chem. News, 1893, 36.

Pyrotoxina Bacterica.—The fever poison produced by bacteria in infectious fevers, is isolated from culture in liquid non-peptonic nourishing media. The process of isolation is based upon the following properties; it is not decomposed by boiling, can be dialyzed, is soluble in water, glycerin and dilute alcohol, but insoluble in absolute alcohol or alcohol of greater than 90 per cent. strength. It forms a deliquescent, white, friable, amorphous mass; is not decomposed by prolonged contact with alcohol; it is not soluble in chloroform or ether; it is not an albnminoid, but has reactions differing from the other known products of bacteria.—E. Cantanin, in Pharm. Ztg., 1894, 136.

Sterilization by Filters.—Filtration through porous filtering media has been considered an excellent method of removing from water any microbe it may contain, but nothing is less certain. As early as 1885 Bourquelet and Galippe had protested against the supposed infallibility of these filters, finding as the result of their experiments that microbes could pass through the porous porcelain. Their conclusions have been confirmed by the experiments of Lacour-Eymard (Revue d'Hygiene, June, 1893). The results of introducing cultures of Bacterium termo, B. coli commune, and Micrococcus prodigiosus into clean and sterilized Chamberland filters, are represented in the following table. The number of colonies per C.c. of the filtered water, found at the end of the eighth to the fifteenth day respectively, being there given in colonies:

Name of Organism.	8th to 10th day.	11th day.	12th day.	13th day.	14th day.	15th day.
B. termo	2 to 5	24	116	——	——	480
B. coli commune	few	——	8	20	24	60
M. prodigiosus	——	——	48	169	234	380

These filters appear, therefore, to be far from affording absolute security; and the porous cylinders should be carefully cleaned and sterilized every three days at least, and a pressure of not more than two atmospheres be maintained, to ensure even relative security.—Médicine moderne, through Bull. de Pharm. de Bruxelles.

The Filtration of Caseïn Solution Through Porcelain.—L. Hugounenq. Porcelain filters allow albuminous substances to pass through them very unequally; asbestos porcelain is traversed more easily than the biscuit of the Chamberland tubular filters. Some proteïds leave a residue on the exterior surface of the filter which never passes through; a small quantity remains fixed in the pores of the septum and resists washing with water. In the estimation of proteïds, 12–15 per cent. loss may occur in this way. The filtration of certain albuminous substances through porcelain is accompanied by chemical changes. Gas is evolved, and caseïn precipitable by acetic acid, passes through to the extent of one-third its total amount. The asbestos of ordinary porcelain filters only allows the precipitable caseïn to pass through when the alkalinity of the solution corresponds with a value requiring 1.5 Gm. of sulphuric acid per litre to neutralize it, and even then considerable residue remains behind; this can only be avoided by rendering the solution more alkaline. The chemical composition of a culture medium containing proteïds gives no indication as to its chemical composition after sterilization by means of the tubular filter.—Ann. Chim. Phys. [6] xxviii., 528–537; Jour. Chem. Soc. (Abs.), 1893.

ANTISEPTICS, DISINFECTANTS.

Microbicidic Secretions.—Evolution of Views upon the Nature of.—A. Charrin, in Jour. Pharm. Chim., 1894, 5. A historical review.

Automatic Disinfection.—B. S. Proctor has devised a mechanical arrangement that is only applicable when the cistern which supplies water to the water closet is used for no other purpose.—Chem. and Drug., 1894, 588.

Disinfectants and Disease Germs.—C. Chamberland and E. Fernbach, in a lengthy paper on the disinfection of rooms, describe the results of a great number of experiments with different disinfectants on bacteria in various conditions. They find that the eau de javelle of commerce, chlorinated lime (a 1 in 12 solution diluted to ten times its volume with water), and commercial hydrogen peroxide, are more active than a 1 in 1000 acid solution of corrosive sublimate. When employed at the ordinary temperature, however, they do not act, or only after several hours upon moist germs, but if they be heated to 40°–50° C., or even higher, these germs are destroyed rapidly, a few minutes sufficing. It would seem desirable, therefore, to use disinfectants at as high a temperature as possible. Dry germs were found to be much more resistant than moist ones, for where a few minutes sufficed to kill the latter, the dry forms were able to resist a temperature of 40°–50° for several hours. Before the disinfectants could act properly, also, it was necessary to soak the dry germs in water, preferably lukewarm, for about an hour, after which they were as readily acted upon as moist germs. It follows, therefore, that it should be regarded as absolutely necessary that the walls of rooms should be sprayed with water before a disinfectant is employed. A noteworthy fact to which attention is called is that concentrated solutions of chlorinated lime are much less active than the same diluted with ten or twenty times their volume of water. This holds good whether moist or dry germs are to be destroyed, and at either the ordinary temperature or at 50° C. The Bacillus subtilis was the organism chiefly experimented with, being selected on account of its great resisting power. When the germs were in the moist condition, liquid cultures were mixed with disinfectants, in definite proportions, and the whole well shaken together. Cultivations were made from the mixtures from time to time, and the results checked by some of the original culture that had not been acted upon by disinfectants. The dry germs were treated upon glass slips, and not upon silk threads, as is usually the case. With regard to the action upon other organisms of the disinfectants employed, they were found to destroy in a few minutes, and at the ordinary temperature, the spores of Bacillus anthracis, Aspergillus niger, Saccharomyces cerevisiæ, and B. typhosus. Thymol, lysol, and oil of turpentine were found to yield relatively bad results as disinfectants, and preference was given to chlorinated lime solution, diluted as above.—Ann. de l'Inst. Pasteur, vii., 433.

Disinfectants.—C. M. Stewart has made numerous experiments for the purpose of ascertaining what agent, alone or combined, would best answer the requirements for a dental disinfectant. The germs used in these experiments were those often found in the mouth, the Staphylococcus pyogenes aureus and albus. The germs were grown in test-tubes containing beef bouillon. The following disinfectants have been tried: Bichloride of mercury, oil of peppermint, permanganate of potassium (1 and 4 per cent. solutions), chloro-phenique, listerine, saccharine, aseptol, creolin, creosol, quinoline and lysol. Lysol more nearly answers the definition of a disinfectant than any agent experimented with, as it is a prompt and effectual deodorizer, a good detergent and a prompt germicide; combining in one drug the qualities so essential for a dental disinfectant. When used on very sensitive surfaces, the weaker solutions should be used first, as irritation results from the immediate application of a 5 per cent. solution to such surfaces. In addition to its prompt, beneficial action, lysol is not disagreeable to most patients, and is seemingly uninjurious to the teeth.—Brit. Jour. of Dental Sci., Oct. 16, 1893; Pharm. Jour. Trans., 1893, 525.

Influence of Solvents on Germicides.—Recent experiments by P. Lenti have demonstrated that absolute alcohol completely neutralizes the germicidal action of both corrosive sublimate and carbolic acid with regard to anthrax spores, and that a considerable proportion of water must be added before any germicidal action can then take place. Glycerin impedes the action of sublimate when less than forty per cent. of water is present, and of ten per cent. solutions of carbolic acid when they consist of less than eighty per cent. of water. Carbolic acid and lysol also lose their disinfecting property entirely when dissolved in olive oil. It would appear, therefore, that alcohol, glycerin, and fatty bodies are unsuitable ingredients of liquid disinfectants.—Rev. d'Hygiene, through l'Union Pharm., xxxv., 58; Pharm. Jour. Trans., 1894, 733.

Antiseptic Essences.—F. Forné finds that the vapors given off, in a limited enclosed space, by the essences of niaouli and cajeput hinder the growth of certain bacteria and moulds, whilst the fructification of the latter is delayed even when the space is not so limited. The sterilizing action is chiefly exerted upon the culture medium, and the sterilizing power of the vapors from the essences is proportional to the time during which they have acted upon this medium and the extent to which it is impregnated by them. Other things being equal, essence of niaouli acts better than oil of cajeput, but it is noted that the former, placed in direct contact with the spores of *Penicillium glaucum*, stimulates their vegetative energy.—Ann. de l'Inst. Pasteur, vii., 529; Jour. Pharm. Chim., 1893, 318.

Toxicity of Antiseptics.—Desequelle and Charvim (Nouv. Rem., x., 159,) have compared the toxicity and bactericidal power of a number of recently introduced bodies derived from corrosive sublimate by the replacement of an equivalent of chlorine by equivalents of various phenols and naphtols. The results are represented in the following table, the antiseptic and bactericidal power of sublimate itself being taken as one hundred:

	Antisepticity.	Toxicity.
Phenol sublimate	104	12.5
Mercury hydroxy-phenolate	46	16
Phenol acetate mixed with Hg	41	16
Naphtol sublimate	32	27
Mercury beta-naphtolate	61	25
Mercury acetate	50	45

Though the differences in antiseptic power are very marked, the variation in toxicity is evidently much greater.

Antiseptic Mouth-Pearls, consisting of thymol, menthol, eucalyptol, vanillin and ethereal oils combined with sugar have been patented. They are said to have a local action only, and are recommended for children troubled with catarrhal affections.—Amer. Drug. and Pharm. Rec., 1894, 185.

Antiseptic Powder.—A. Pick says the following formula has given him very satisfactory results in all cases where iodoform is ordinarily employed:

Corrosive sublimate	$\frac{1}{5}$-$\frac{1}{3}$	grain.
Boric acid	1	ounce.
Tannic acid	10	grains.
Milk sugar	sufficient for 2	ounces.

$\frac{2}{5}$ grain of corrosive sublimate, in this mixture, gives a 1 : 5000 trituration of bichloride, and 1 grain, one of 1 : 1000. The sublimate should be mixed very gradually and thoroughly with the milk sugar, the other ingredients being slowly added one by one, in order to obtain a uniform distribution of the bichloride.—Ibid., 339.

Disinfection.— R. Traugott has experimented upon the disinfecting power of non-poisonous agents. He concludes that as much as 100 Gm. of 5 per cent. solution of peroxide of hydrogen can be taken internally without ill effects, and that a 1 per cent. solution is quite as effective as a 3 per cent. solution of carbolic acid. Even a $\frac{1}{2}$ per cent. solution of the peroxide is fatal to the germs if the exposure is prolonged. It is more expensive than carbolic acid or corrosive sublimate, but its non-toxic properties are reason enough for its use. Trichloride of iodine is another non-poisonous disinfectant which has the advantage of cheapness. It is best kept as a 5 per cent. aqueous solution, which keeps well and has an odor of chlorine and iodine. The bacilli of typhoid fever, cholera and diptheria are destroyed by a 1 per cent. solution in one minute, and the two latter species succumb to 0.1 per cent. in the same length of time. The typhoid fever bacillus required an exposure of five minutes with a 0.1 per cent. solution. The price of a 0.1 per cent. solution is stated to be about quarter that of a 3 per cent. solution of carbolic acid.—New Eng. Drug., 1894, 135.

Ammonia Disinfection.—G. v. Riegler (Centralb. f. Bact., 1893, 651). Aqua ammonia in plates or other suitable vessels is placed in different parts of the room, while the doors and windows of the latter are kept well closed. The author has found by experiment in cultured bacilli that cholera and typhus bacilli were destroyed in two, malignant pustule spores in three, and diphtheria bacilli in four hours.

Carbon Dioxide as a Germicide.—Researches conducted by Hankin have led to the satisfactory result that the carbonic acid in aerated waters is destructive to pathogenic micro-organisms. The microbe of cholera perishes in a few hours after bottling. The bacillus of typhoid is destroyed within a week or ten days.—Chem. News, 1894, 46.

Carbon Dioxide as a Germicide.—Experiments by C. Nowery and C. Michel (Comp. rend., 1893) seem to prove that the gas does not really exert a microbicide action in the correct sense of the term, but that it checks the development of the micro-organisms in milk.

Copper Salts as Disinfecting Agents.—Gruen has published an article on this subject in the Zeitschr. f. Hygiene u. Infections Krankheiten in which he gives the results of a series of rational experiments made with the view of determining the actual disinfecting properties of the various soluble salts of copper, viz.: commercial copper sulphate and the same salt pure, copper chloride (cupric chloride, $CuCl_2$), copper alum, copper nitrate, sulpho-carbolate of copper, ammoniated copper sulphate and copper acetate.—Reprinted in Nat. Drug., 1893, 149.

Cresol as an Antiseptic.—Lacroin-Hunkiarbéyendian.—Jour. Pharm. Chim., 1893, 349.

Formaldehyde as an Antiseptic.—Slater and Rideal conclude, as the result of numerous experiments, that formaldehyde in solution and as a vapor possesses decided antiseptic and disinfectant (?) properties, and suggest that its non-poisonous character, easy vaporization, and freedom from corrosive or other damaging action on fabrics, will render it useful for many purposes of practical disinfection. The results of their experiments fully confirm the conclusions of Trillat and others, as to the efficiency of formaldehyde as an antiseptic and sterilizing agent, the power of inhibiting the growth of micro-organisms being possessed by it in a high degree. The microbicide power of the vapor of the compound also appears to be very marked, but it is not correct to assume on this account alone that "formaldehyde vapor is obviously a powerful disinfectant." Indeed, no proof of real disinfecting power is given in the published report of the experiments.—Lancet, 3686, 1006.

——— A patent has been granted for "a new antiseptic material," consisting of a 40 per cent. solution of formaldehyde, under the name of "formalin." In the specification it is claimed to have but a small poisonous effect on the human organism. The method of preparation preferred is to pass air through methyl alcohol, and then over gently heated, oxidized copper gauze, after which the resulting mixture of air and gaseous formaldehyde is passed into water.—Pharm. Jour. Trans., 1893.

Electrical Disinfection.—The practical value of electricity as a disinfectant of sewage has recently been demonstrated by Woolf, the inventor of the system. For a town of 30,000 inhabitants the plant can be supplied at a cost of $5,000, while the expense of manipulating the sewage will not exceed $4.00 per day. From the reports published in the secular press, it is inferred that a disinfecting fluid is prepared which is conducted into the sewer, and it is said that this fluid will instantly kill the germs of all contagious diseases, including those of cholera, diphtheria, scarlet fever, measles, typhoid and typhus fever.

The utility of this method seems to be dependent upon the presence of ozone, as it is said the disinfected sewage on being submitted to a chemical test shows the presence of a considerable percentage of this substance, which is known to be an active devitalizer of organic matter. At the same time, the method is said to possess certain disadvantages, inasmuch as putrid meats can be almost instantly restored to their original purity, hence the prospect of being served with such food is not exhilarating.—Amer. Therap., 1893, 32.

Microbicide Action of Gallanilid or Gallanol.—Cazeneuve concludes that gallanilid in excess completely arrests the life of microorganisms. In a weak solution (1 part in 1000) it diminishes the vegetability of anthrax and staphylococcus, arrests that of the bacillus of Eberth, but has no influence upon the pyocyanic bacillus and that of the bacillus coli. In a very weak solution (1 part per 5000) it does not arrest all the vegetability of the micro-organisms, but it completely destroys all pathogenous power. A little of the powder of gallanilid added to a culture broth rapidly destroys the bacillus of cholera. It is not poisonous if introduced into the digestive canal, even to the extent of 5 Gm. in powder. If injected into the blood in an alkaline solution it is poisonous.—Bull. Soc. Chim. de Paris, xi. and xii., No. 3.

Gas Tar as a Disinfectant.—Danilewsky (Pharm. Zeit. f. Russ., 1893, 485) recommends the following as being much preferable to the process of Nenski and Raptschenski. Slake 750 Gm. of burnt lime, with about 1,250 to 1,500 Gm. of water, and when thoroughly slaked add 500 Gm. of tar in divided portions, stirring well after each addition for a quarter of an hour. The result is a light yellowish brown mass, from which the disinfecting fluid can be prepared by stirring well with water, allowing to settle, and decanting the clear "phenol-calcium" or lime carbolate water which separates after standing an hour. This disinfectant is at the same time cheap, available and efficacious.

Sunlight as a Disinfectant.—Sunlight, according to the experiments by Marshall Ward, is a far more powerful agent in the purification of the atmosphere than has hitherto been recognized. The anthrax bacillus, for instance, will withstand the greatest extremes of temperature, but is killed by direct sunlight. Water is also thus purified.—West. Drug., 1893, 402.

Heat and the Destruction of Bacteria.—It has been ascertained by Heider (Archiv. für Hygiene) that in the majority of cases the influence of disinfectants is felt more readily when applied to bacteria in the presence of heat. This enables a great saving in materials to be effected. For instance, he found that anthrax spores were destroyed in less than two hours in a 5 per cent. solution of carbolic acid at 55° C., and the same result was obtained with a 1 per cent. solution of that acid, in two and a half hours, at a temperature of 75° C. Other disinfectants gave equally satisfactory results when similarly employed.—Drug. Circ., 1893, 203.

H_2O_2 as a Disinfectant.—Traugott points out that H_2O_2 may be substituted for corrosive sublimate or carbolic acid as a disinfecting agent, when sufficient time (15–30 min.) can be allowed for it to act properly.—Pharm. Jour. Trans., 1893, 342; from Zeitschr. f. Hygiene, xiv., 427.

Iodocasein is a new antiseptic introduced by Röhrmann. It is described as a yellowish powder, having a faint odor of iodine, which it is expected to be able to overcome in the near future by suitable improvement in the method of preparation. More definite data are wanting.

The Comparative Action of Iodoform on Staphylococcus and on the elements entering into the composition of blood has been investigated by E. Maurel (Bull. Gén. de Thérap., 1893, 241), by (1) submitting the blood elements to the action of a staphylococcus culture on gelose; (2) submitting the same elements to the action of iodoform; (3) submitting staphylococcus to the action of iodoform; and (4) allowing iodoform to act simultaneously on that micrococcus and on the blood elements. The leucocytes of human blood absorb, at body temperature, the staphylococci of a gelose culture, but succumb to that absorption within two hours; the blood corpuscles separate, but dissolve and disappear after fifteen hours; and fibrin, which is at first precipitated, is redissolved after twenty-four hours. Iodoform in doses varying from 10 Cgm. to 2.50 Gm. per liter of blood has no toxic action on the leucocytes; on the contrary, their activity seems to increase proportionately to the dose employed. The author found that iodoform has no apparent action on the reproductivity of staphylococcus, but lessens its *virulence* against leucocytes when blood is submitted to its presence at the same time. From these results the author draws the conclusions, that three distinct properties must be recognized in various microbes, but especially in staphylococcus, *virulence*, *reproductivity* and *survivency*, and that the efficiency of iodoform against staphylococcus, which has been demonstrated by clinical practice, is due to its double action in increasing the activity of the leucocytes, and in diminishing the virulence of the staphylococcus.—Amer. Jour. Pharm., 1893, 549.

Antiseptic Value of Ozone.—J. De Christmas (Annal. de l'Inst. Pasteur, 1893, vii, 689), finds that ozone added to air in the proportion of 0.1 per cent. by volume, possesses antiseptic properties, as there is a cessation in the development of the spores of pathogenic microbes on the surface of objects exposed to this gaseous mixture. But so soon as the proportion of ozone falls below 0.1 per cent. all antiseptic action ceases. It thus follows that ozone is impracticable for use in the disinfection of houses and hospitals; because, on the one hand, the practical difficulties in the production of ozone in sufficient quantity have not been overcome, and, on the other hand, the air becomes unfit for respiration long before it is saturated with ozone to the degree required. Hence all appliances and "ozonizers" recommended for disinfection depend upon an erroneous assumption.

Aseptic Hypodermic Solutions.—Berlioz and Duflocq describe methods adopted by them for administering medicines subcutaneously without risk of septic poisoning. The solutions are prepared under conditions of absolute asepsis and preserved in tubes of yellow glass, containing from two to four C.c. each. The neck of each tube is drawn out to a tapering point after filling; sterilization is effected before closing in an autoclave or a vacuum apparatus, according to the volatility of the liquid. When required for use the neck of the tube is broken off and the needle-point of the previously sterilized syringe is immediately introduced into the opening thus made. Full working details, with illustrations of the apparatus employed, are given by the authors.—Rép. de Pharm., 1894, 49.

Alkaline Antiseptic Solutions.—Efforts have been made to utilize certain organic bases of neither caustic nor toxic effects, as solvents for a number of the most frequently used antiseptics, so that these may assume a form which will not coagulate albumen; and the interesting fact appears to have been established that the antiseptic strength of these strongly alkaline solutions is very much greater than that of the simply aqueous, though equally concentrated, solution of the antiseptic in question. It is stated (Aerztl. Rundsch., 1894, 198) that the antiseptic in solution with ethylenediamine and its alkyl derivatives, as also those of monochlorhydrine, dichlorhydrine, epichlorhydrine, ammonia, or piperazine, is no longer precipitated by albumen, and that the membranes of the bacilli are thinned, if not entirely dissolved—a circumstance greatly facilitating the action of the antiseptic. The bactericides forming, with these organic bases, solutions which do not coagulate albumin, are the phenols (as carbolic acid, cresols, xylenols, thymol, naphtol, creosote, guaiacol) and the silver salts. The cresol solution, for instance, is prepared (by a patented process) by dissolving 1 part of ethylenediamine in about 50 parts of water and allowing 1 part of freshly distilled coal-tar cresol to flow into the solution. When the cresol is replaced by creosote or guaiacol, it is advisable to employ a larger quantity of ethylenediamine.

Sublimate as a Disinfectant in Dwellings.—In Stockholm dwellings are now disinfected by means of corrosive sublimate, some 3 or 4 Gm. being used for each room. Sjôqvist (Aertz. Prakt., 1893), has examined the urine of a number of inhabitants of disinfected rooms, and has found mercury present in two cases only. The sublimate is found to be only very slightly volatile at the room temperature, and a year after the disinfection sublimate was found in large quantities in the wall papers.

Sterilization of Hypodermic Injections.—According to Moriacci (Farmaceuta Italiano, 1893) micro-organisms will develop in solutions of strychnine, curara, eserine, morphine, quinine and atropine. Sterilization by means of heat does not, he states, alter the effects of strychnine or quinine at all. Whereas it so alters that of morphine, atropine and eserine, that a larger dose than otherwise necessary must be employed. He urges the necessity of sterilizing the syringe. For atropine and eserine he advises the addition of 1 per cent. of their weight of mercuric chloride, which completely sterilizes, but is not present in sufficient quantity to be harmful in the least. For morphine he says he knows of no method of sterilization that will not alter the effect of the drug.

Steresol, a New Antiseptic Varnish, is said by Berlioz (La France Méd., 1893, No. 23) to adhere perfectly to the mucous membranes and the skin, the phenol (which is its active ingredient) not evaporating completely from the layer of varnish until after 24 hours. Its application is not painful, nor does it cause eschars, it is reported; and is said to have been remarkably beneficial in ulcerations. It permits of permanent asepsis of mucous membranes and of parts of the body where it is impossible or difficult to keep on bandages. Its composition is as follows:

Gum-lac, purified, entirely soluble in alcohol	270	Gm.
Benzoin	10	"
Tolu balsam	10	"
Carbolic acid, crystallized	100	"
Cinnamon oil	6	"
Saccharin	6	"
Alcohol ... sufficient to make	1	litre.

BACILLI.

Bacillus orthobutyricus.—This is an anaerobic microbe isolated by L. Grimbert, occurring in the form of a movable, cylindrical rod, rounded at the extremities, and measuring from 3μ to 6μ in length by 1.5μ in breadth. When young, however, it is shaped like the clapper of a bell. The older organisms form spores, two or three in number, and their movements then cease. The spores resist the temperature of 100° C. for one minute and of 80° for ten minutes. The bacilli are capable of inducing fermentation in glycerin, mannite, glucose and invert sugar, saccharose, maltose, lactose, galactose, arabinose, starch, dextrin, and inulin, but they are without action on trehalose, erythrite, or calcium lactate and tartrate. The products of the fermentative process are normal butylic alcohol, butyric, acetic, and carbonic acids, and hydrogen. The B. orthobutyricus differs from the B. butyricus of Pasteur and the B. amylobacter of Van Tieghem in not affecting calcium lactate or cellulose, nor it is colored blue by iodine at any period of its development. From the B. butyricus of Fritz it is distinguished by its property of fermenting lactose and starch, and its inability to invert saccharose. Lastly its power of forming normal butylic alcohol from various carbohydrates clearly distinguishes it from B. amylozyme of Perdrix. This new organism is said to secrete a diastasic substance analogous to the amylase which transforms amylaceous bodies into maltose and dextrin, but the latter is also converted into maltose, by the action of the bacillus, so that it cannot be identified during fermentation. Inulin is decomposed by it without undergoing saccharification; the glucose of invert sugar disappears first, the lævulose offering greater resistance; saccharose ferments without inversion, in a similar manner to maltose and lactose; glycerin, besides acetic and butyric acids and butylic alcohol, yields a small quantity of a left-handed lactic acid; and galactose, arabinose, and mannite behave like glucose, except as regards the relation between the products formed. Grimbert shows, however, that various factors—the nature of the medium and the manner in which it is decomposed, the duration of the fermentative process, the age of the bacilli, and the extent of their acquired habits—may modify the chemical action of the microbes. He suggests, accordingly, that the contradictory results obtained at times by bacteriologists may possibly be attributable to similar apparently minor points, which he has proven in his present work to be factors of considerable importance.—Journ. Pharm. Chem., xxix, 281.

Bacteria and Colds.—Schenk has found that micro-organisms move towards warm points. This movement he terms thermotaxis, and he concludes, as the result of experiments with a specially constructed apparatus, that warmth acts as a stimulant on micro-organisms, which move towards a warm body in their neighborhood, and that this thermotaxis is a vital property of bacteria. He further considers that in certain cases of "catching cold" an infection is conveyed by bacteria. Thus a person entering a cold room would attract the bacteria present by his warm body, and these, finding admission through the skin or otherwise, produce, after a certain time of incubation, the results ordinarily attributed to "catching cold." The hair bulb sheaths, sweat glands, and mucous membranes are all said to offer possible points of entry to bacteria.—Pharm. Jour. Trans., 1893, 148.

Bacillus of Soft Chancre.—Unna (Deutsch. Med. Wochenschr., 1893, 19) demonstrates that he has found the same bacillus in five typical cases of chancre. It is a strepto-bacillus occurring in long chains, and meanders with the plasma cells and leucocytes. It may be detected by its stain with an alkaline solution of methylene blue.

Cholera Bacilli—Detection of.—Method tried at the Institute of Infectious Diseases, Berlin. A little mucus from the liquid part of the object to be examined is fixed on a cover glass, and stained with diluted Ziehl's fuchsine solution. Cholera bacteria, in such a preparation, would occur either alone or mixed with the ordinary intestinal bacteria, B. coli. They are said to lie as a rule where the mucus is drawn into threads, and in the characteristically formed groups the individual bacilli lie in one direction. But even when the bacteria are scattered and perhaps mixed with the B.

coli, it is stated that Asiatic cholera may be diagnosed with certainty. Only when the specimen is a very mixed one is there any uncertainty in the matter.

Cholera Bacilli—Culture Method.—Koch now places the lumps of mucus in a one per cent. sterilized peptone solution in a reagent glass, and keeps at 37° C. When the preparation becomes turbid the bacteria are found on the surface. This requires 6 or more hours. These peptone cultivations are said to have given positive results when gelatin plates failed. The most satisfactory method is to combine the two processes.—Pharm. Jour. Trans., 1893, 85; Journ. Zeit. f. Hygiene, through Med. Press, cxvi, 643.

Immunity Against Asiatic Cholera.—P. Tsiklinsky. This article is mainly a review of the results obtained by M. Issaef, in his experiments on vaccination against cholera. These results are, to a certain extent, remarkable, as they do not agree well with the usual ideas on the subject. These experiments led to the following conclusions: (1) That other liquids as physiological solution of sodium chloride, soup, and a 2 per cent. solution of nucleine, will give immunity, provided that they are not very toxic. (2) The resistance thus acquired is temporary, and, while becoming gradually weaker, disappears after four or five days. (3) The protective liquids should be inoculated twenty-four hours before the infection (the time of greatest resistance). (4) The protective power of different liquids varies considerably, the most feeble being sodium chloride, then urine, soup, normal blood, and 2 per cent. nucleine. These and other experiments brought M. Issaef to the opinion that the cause of the protective power was to be found in the action of the cellular tissues. It shows the great importance of the natural forces of our organism to the favorable issue of an illness.—Chem. News, 1894, 246; from Rev. Gen. des Sci., Pure et Appl., April 1894.

Ætiology of Cholera.—Sanarelli (Ann. de l'Inst. Pasteur, 1893, 693), advances the idea that the morphological unity of the cholera bacillus must be abandoned, since there exist different varieties of vibriones morphologically distinct, which are capable of producing in man and in the lower animals one and the same type of cholera, clinically identical. Koch's bacteriological diagnosis of cholera as recently established, agrees neither with the idea of a limited monomorphism nor with the assumption of a polymorphism of the vibriones, since in every impure water we may find pathogenous microbes which possess quite the same character as the specific exotic vibriones. In addition to the morbific forms originating in the water, which exactly resemble those from the bowel, there are found in water a number of non-pathogenous microbes which approach the former very closely, so that they may be regarded as varieties capable under certain circumstances of resuming their former (?) malignant properties.

This constant occurrence of pathogenic microbia in all sewage is a proof of the great importance of the pollution of water for the origin and spread of cholera. The water-vibrios and those of cholera dejections are in every respect very closely allied, which points to a common origin. Virulent vibriones do not long retain their malignant character. They gradually disappear along with the other characteristic properties of the vibriones, such as the formation of nitrites and of indol.

Cholera, a Nitrite Poisoning.—Emmerich and Tsuboi (Münchener Med. Wochenschrift) come to the conclusion that cholera is a nitrite poisoning, basing their conclusions upon the facts that the cholera bacillus is able to a greater extent than any other bacillus to reduce nitrates to nitrites, and the internal administration of nitrites in quantity of 0.5–0.6 Gm. is capable of producing very similar physiological effects in man. While other varieties of bacteria are capable of forming nitrites, none of these thrive in the intestines.—Apoth. Ztg., 1893, 322.

Bacilli and Disease.—O. Liebreich does not accept the comma bacillus as the cause of cholera. It may be, but at present he can only see in it a "symptom" of cholera, and the actual cause of that disease is as much a mystery as the cause of diphtheria or pneumonia.—West. Drug., 1893, 328.

Transmission of Cholera by Means of Flies.—Lawtschenko (in Centralbl. f. Bakt. u. Parasit., Band xii., 25,) has found that cholera bacilli possessing all their virulent properties can be demonstrated for at least four days in the intestinal canal and dejections of flies that have been feeding on the stools of cholera patients, or on the intestinal contents of those who have died from the disease.

Distribution of the Bacilli of Diphtheria in the Body.—Frosch (Zeit. f. Hygiene) gives the results of his investigation of fifteen fatal cases of diphtheria. In five of these the specific bacteria were not found in the internal organs; in the other ten the diphtheria bacilli were isolated from the blood and various organs. The bacteriological examinations were made as soon as possible after the death of the patient. The ordinary method of making agar plates was employed. In some of the cases the bacilli were unusually distributed through the body, as indicated by their isolation from the blood, spleen, liver, kidneys, cervical and bronchial lymphatic glands, lung (when hepatized), pericardial and pleuritic effusion, and the brain. In a few cases they appeared in the cultures from spleen or kidneys only. Babes, Kolisko, Paltauf, and Spronck, are the only observers who have made similar observations in the past. The results obtained by Frosch bring out very important facts.—Drug. Circ., 1893, 274.

Diphtheria Antitoxin.—See Amer. Drug. and Pharm. Rec., 1893, 318; Bull. Pharm., 1894, 78; also Pharm. Zeit., xxxix., 214.

To Detect Influenza Bacilli in Blood.—Spread the blood upon cover glass slips. Dry thoroughly. Put in absolute alcohol 5 to 10 minutes. Stain as follows: Take 40 Gm. of aqueous solution of methylene blue; 20 Gm. of ½ per cent. solution of eosin dissolved in 70 per cent. alcohol; 40 Gm. distilled water. Place the cover glasses in this solution and heat in an incubating oven at 37° C. from three to six hours. Then wash in water, dry, and mount in balsam. The eosin stains the red blood corpuscles red and the leucocytes blue. The bacillus is seen in these as short rods often resembling diplococcus.—Microscopical Journal, West. Drug., 1894, 99.

Mucus a Bactericide.—Wurtz and Lermoyez find that mucus possesses bactericidal properties.—Amer. Therap., 1893, 179.

Tuberculosis Contagious.—Summary of conclusions by H. M. Biggs, the Chief Inspector of Pathology in the Health Department of the City of New York.—Amer. Drug. and Pharm. Record, 1894, 29.

To Stain Tubercle-Bacilli.—Czaplewski (Arb. aus dem Path.-Anal. Inst. zu Tubigen, 1893, B. i, H. 3; Monatsh. f. Prakt. Derm.) recommends the following procedure: The sputum is first spread in a thin layer upon a slide, dried in the air, and carefully passed through the flame of a Bunsen burner. Then carbolfuchsin is added, and heated until the vapor of steam arises, when a solution constituted as follows is dropped upon the slide obliquely, until the surface is cleared: hydrochloric acid and sodium chloride, each 2½ parts; distilled water, 100 parts; a solution is made, and alcohol, 500 parts, added. The slide is then washed with water, permitted to dry in the air, and finally a drop of some immersion-oil added that can be readily removed by xylol.—See, also, Jour. Pharm. Chim., 1894, 444.

Tubercle Bacilli in Sputum.—Ilkewitsch detects tubercle bacilli in sputum by mixing, in a porcelain capsule, suspected sputum, 0.5 C.c.; distilled water, 20 C.c., and caustic potash solution (30 per cent.), 8 to 12 drops. The mixture is well stirred with a glass rod and heated until vapor is given off. When the sputum is quite dissolved a little casein is added, which also dissolves, under the combined influence of heat, stirring, and one or two drops more of the caustic potash solution. The milky fluid resulting is placed in a test tube, and acetic acid added, drop by drop, until clotting of the albumen commences. The mixture is then submitted to centrifugal action for five to ten minutes, all the bacilli present being thus carried down with the casein. The deposit is collected and rubbed between two slides, the two preparations are dried, fixed in the flame as usual, stained by Ziehl's method, and examined under an oil immersion lens without a cover slip. Compared with other methods, this of Ilkewitsch is said to have the advantage of allowing a larger amount of material to be examined in a short time.—Central. f. Bakt., through B. M. J. Epit., 1738, 64.

Tubercle Bacilli in Sputum.—A modification of Eberth's process described by Reynes in Jour. des Connaise med., is reprinted in Nat. Drug., 1893, 139. Spread a portion of the material on a previously sterilized cover-glass in the usual method (by rubbing between two cover-glasses until a very tenuous layer is obtained), and fix it by passing thrice through flame of an alcohol-lamp. The staining may be performed either by the hot or cold method. The former, which is the more rapid, consists in boiling the cover-glass for five minutes in Ziehl's solution, which has the following formula:

Saturated alcoholic solution of fuchsin	10	parts.
Phenic acid, crystalized	5	"
Absolute alcohol	10	"
Distilled water	90	"

The cold method consists of leaving the cover-glass floating, the prepared face downward, in the same solution for twenty-four hours, keeping the whole under a bell-glass or other protector, When the preparation is stained, remove the cover-glass from the capsule and, without rinsing, plunge it for ten seconds in a bath consisting of 4 parts of alcohol and 1 part of pure nitric acid. On removing the cover-glass plunge it for fifteen seconds into alcohol of 60° or 70° C., and finally wash well with water.

——— Pewsner and Nastinkoff in Wratch (Nat. Drug., 1894, 61). Prepare a solution of mercury bichloride, 1 : 2000. Shake a portion of this solution in a test-tube, along with a few drops of aniline oil, and filter off. To 10 C.c. of this filtrate add 1 C.c. of a 10 per cent. solution in absolute alcohol of gentian violet, methyl violet, or fuchsin. The material to be examined is placed for five minutes in this staining solution, care being taken to keep the watch-glass or other container covered during the immersion. The section, cover-glass preparation or other material, is then washed in water, and is ready for the complementary stain. For this is recommended a solution of malachite green or eosin in the sublimate solution first made, 6 Cgm. of the dry color to 60 Gm. sublimate solution. The preparation must be barely dipped into this solution for one or two seconds at the outside. The total tinting ought not to occupy over six minutes, and a person used to doing such work can get the specimen ready in five and a half minutes, including washing, etc. The results are everything that can be wished. To show tubercle bacilli in the structures (kidney, lung, etc.), macerate the latter for two days in absolute alcohol. Remove and place in a chloroform solution of paraffin (paraffin, 5 parts; chloroform, 1 part), and keep at a temperature of 55° C., for a half hour to an hour. Remove, and place in pure melted paraffin, and keep in it at a similar temperature for twenty minutes. Embed, in the usual way, in paraffin. Clean the sections first with xylol, then with absolute alcohol, and finally with water. They are now ready for staining, as already detailed. Cover-glass preparations of sputa are fixed in the usual way, by being carried thrice through an alcohol flame. The stained sections can be examined directly with glycerin as a medium, or may be prepared by the well-known methods for mounting in balsam.

Artificial Medium for Tuberculosis Cultures.—E. A. de Schweinitz prepares the following:

Distilled water	1,000 C.c.
Magnesium sulphate	0.2 Gm.
Acid potassium phosphate	1.0 Gm.
Ammonium phosphate.	10.0 Gm.
Sodium chloride	10.0 Gm.
Asparagine	2.0 Gm.
Glycerin	70 C.c.

The multiplication of the tuberculosis bacillus upon this liquid is not quite so rapid as on one containing peptone, but is equally characteristic, and is promising for further study. Its use may prove of service to other investigators.—N. Y. Med. Jour., 1893.

Microscopical Diagnosis of Tuberculosis.—E. B. Shuttleworth, in Canada Lancet; reprinted in Drug. Circ., 1893, 154.

Thörner's Method of Detecting Tubercle Bacilli in Milk.—Thörner employs the following process: 20 C.c. of the suspected milk are mixed with 1 C.c. of a 50 per cent. potash solution, and heated in a bath of boiling water until the fat is saponified, when the solution turns a yellowish-brown. By this process the casein and albumen become soluble in acid. Add 20 C.c. of acetic acid, shake the solution, heat on a water-bath for three minutes, transfer it to a strong glass tube, and turn in a centrifugal machine for ten minutes. The liquid is then poured off and the sediment is washed by shaking it with 30 C.c. of hot water, and it is again centrifugalized. The water is then poured off and the sediment placed on cover-glasses, which are treated in the ordinary way of staining cover-glass preparations for tubercle bacilli.—Ibid.

Tubercle Bacilli Transmitted by Cigars.—Kerez, in Centralbl. f. Bakt.; Amer. Drug. and Pharm. Rec., 1894, 118.

Pathological Relations of Bacillus typhosus and Bacterium coli communis.—E. Agro (in Ann. de Microg.; Jour. Pharm. Chim., 1894, 422) has found:

1. That the mixture of the two cultures is toxic even in doses less than the corresponding fatal dose of either of the two cultures—on condition, however, that the mixture be not reduced below the sum of ⅓ + ⅓ of each.

2. The action of the two inoculations ceases to exert its compensatory effect when a certain time elapses between the first and the second (performed with the culture of the other bacillus). Thus, the first inoculation confers upon animals an immunity with respect to the subsequent inoculation of a mortal dose of the culture of the other bacterium.

3. The associated cultures of the two bacteria possess a degree of virulence far more considerable than that of the isolated cultures, or of their mixture.

4. The mixture of the two sterilized cultures possesses a toxicity much greater than the sterilized cultures taken separately—to a certain extent.

By way of general conclusion, the author declares that the presence of the comma bacillus in the human and animal intestine is not under physiological conditions a cause of malady, either because this bacterium is not capable of penetrating the intact walls of the intestine, or because, even if its products were absorbed, absorption proceeds slowly in a definite relation to elimination, and in such manner as not to affect the organism. But the presence in the intestine of a bacterium capable of modifying the physiological functions of the intestinal walls might certainly give rise to conditions which would facilitate a more intense and rapid absorption not only of its products but also of those of the comma bacilli—which, if capable of injuring the organism, would certainly do so, since the intestine is then the seat of the disorders. In abdominal typhus an abnormal state of the intestine is not only grave, but long persists. It thus favors the absorption of the products of other bacteria of the intestine, among which is the comma bacillus, and at the same time an increase in the production of toxic substances.

Exit the Mouse-typhoid Bacillus.—Löffler's typhoid-bacillus inoculation, the application of which in Greece against the plague of field-mice created quite a sensation a year or two ago, has finally gone into the great limbo of scientific failures. It was practically stigmatized as useless in this country by the Parliamentary Commission on the plague of voles in the border counties, and now the German papers are regretfully obliged to admit its inefficacy. The remedy was tried on a large scale in Germany this summer in the district of Lehe in Hanover, and in Wurtemberg, without the slightest effect. On the other hand, phosphorus pills, and sweetened and afterwards poisoned decorticated oats, have proved very useful.—Chem. and Drug., 1893, 207.

Bacteria of Whooping Cough.—A summary (Inter. Jour. Micros. and Nat. Sci.; Pharm. Jour. Trans., 1894, 866), is given of previous researches on the subject, and this is followed by notes on clinical cases in which the sputa have been examined. The text is illustrated by an elaborate colored plate, in which the various bacterial forms are depicted at different stages of their development. The remaining sections of the memoir will deal, in detail, with myelin, bacteria, and fungi in the sputum. Particulars will also be given of the methods of preparing and staining specimens, and the whole should form a valuable addition to the literature of the subject.

PTOMAINES.

Study of Ptomaines.—O. de Koninck has submitted to limited oxidation the pyridic ptomaine, $C_{10}H_{15}N$. The acid compound obtained was found identical with the acid derivative of nicotine, $C_6H_5NO_2$.—Compt. Rend., cxvii., No. 26.

Erroneous Idea af Ptomaines.—The Brit. Med. Jour., 1893, points out that not only the community at large, but also many physicians, seem to have wrong ideas about the chemical products of bacteria. The principal error consists in supposing that the toxic properties of these substances can be destroyed by heat, such as is sufficient to destroy the bacteria themselves. Many of these toxines are very stable against heat; and although the bacteria which produced them may be entirely destroyed, the poisonous properties of the substance may remain. Canned goods, if they contained these products when they were put up, may be poisonous, even though sterile. Another mistake is to suppose that the ptomaines are necessarily dissolved or distilled by boiling, but they may remain hidden in the center of a piece of meat. It is perfectly possible to suppose that one sardine only out of a box may be poisonous.

Ptomaines.—A. Garcia. In putrefying mixtures of horse-flesh and pancreas, hexamethylenediamine $C_6H_{16}N_2$, occurs in addition to the diamines already described. Ptomaïnes may be best estimated by Baumann's benzoyl chloride method. In mixtures, the presence of sugar reduces the formation of diamines to about half; the same diamines are however formed. The production of putrescine, cadaverine and hexamethylenediamine is an early phenomenon in such putrefying mixtures at a favorable temperature; it reaches its highest point within about three days, and they are produced in the same proportion throughout. In cystinuria, tetramethylenediamine only is produced in the later stages. Feeding on cheese causes an increase, on carbohydrates a diminution, in diamine production. Infection of nutritive media with the fæces of such patients causes the appearance of ptomaïnes. In media not so infected, exclusion of air hinders the formation of diamines during the first few days (four days in the experiments which are described).—Zeit. f. physiol. Chim., 17, 543–595; Jour. Chem. Soc. (Abs.), 1893.

A Ptomaine obtained from the Urine of Cancer Patients.—A. B. Griffiths. The method used for the extraction of this ptomaine has been described (Compt. rend., cxiii., 656). It is a white substance crystallizing in microscopic needles, soluble in water, and having an alkaline reaction. It forms a chloroplatinate, a chloraurate, and a hydrochlorate. With phosphotungstic acid it gives a yellow precipitate, with phosphomolybdic acid a brown, and with silver nitrate a red precipitate. Mercuric chloride produces with it a grey precipitate, and Nessler's reagent a brownish precipitate. Its composition is $C_8H_5NO_5$. It is very poisonous, producing fever and death in three hours. Cancerine, as the author names it, is not present in normal urine, but is formed in the system in the course of cancer uteri.—Compt. Rend., cxviii., 1350.

A New Ptomaine.—C. Lepierre has obtained a ptomaine from an over ripe cheese made from sheep's milk, which had caused serious digestive disorders in persons who had eaten it. The base which had the formula $C_{16}H_{24}N_2O_7$, was separated in crystalline form. It is described as inodorous, bitter, somewhat acid, slightly soluble in water, and more so in alcohol. Its hydrochlorate is very soluble and crystallizes in large needles; the platino- and auro-chlorides are also crystallizable. The specific rotatory power of the base is $[a]_D = + 11° \ 3$ in water. Its salts are precipitated by acid sodium phosphomolybdate, picric acid, and iodized potassium iodide, but not by tannin.—Compt. Rend., cxviii., 476.

Eczemine is a ptomaine not found in normal urine, but occurs in urine during eczema. It is poisonous, a hypodermic injection having caused in a rabbit fever and finally death. It forms a hydrochlorate, an aurochloride, and a platino-chloride, and yields precipitates with various acids, mercuric chloride and Nessler's reagent. Analysis assigns to it the formula $C_7H_{15}NO$.—Acad. d. Scien., May, 1893; Jour. Pharm. Chim., 1893, 78.

A Ptomaine in Influenza.—Griffith and Ladel (Pharm. Centralh., 1894, 4,) have obtained a ptomaine from the urine of patients suffering from "La Grippe." It is a poisonous base, crystalline, soluble in water, and gave characteristic reactions, its formula being $C_9H_9NO_4$. The urine was made alkaline with sodium carbonate, and shaken with ether, the base removed from the ether by agitating with aqueous solution acidulated with tartaric acid, and from this the base is removed by adding an alkali and shaking with ether. The ether on evaporating leaves the base behind.

Sardinine, a New Fish Ptomaine, has been obtained by Griffiths (Chem. News, 1893, 45), who describes it as a white, crystalline, water-soluble substance, slightly alkaline in reaction, precipitating as a white crystalline hydrochloride with hydrochloric acid, forming yellow crystalline compounds with platinum and gold chlorides, a greenish one with phosphomolybdic acid, yellowish white with phosphowolframic acid, yellow with picric acid, and giving a precipitate with silver nitrate and with Nessler's reagent. It is toxic, producing vomiting, diarrhœa and death. It was obtained from decomposed sardines, and is presumably the cause of such cases of poisoning as have followed the eating of sardines. Among the other ptomaines hitherto isolated from fish are: Parvaline, $C_9H_{13}N$; hydrocollidine, $C_8H_{13}N$; scombrine, $C_{17}H_{38}N_4$; muscarine, $C_5H_{13}NO_2$; gadinine, $C_7H_{16}NO_2$; ethyldiamine, $C_2H_8O_2$; mytilotoxine, $C_7H_{15}NO_2$; collidine, $C_8H_{11}N$, and coridin, $C_{10}H_{15}N$. The first three were isolated by Gautier and Etard from mackerel, the fourth, fifth, sixth and seventh were isolated by Brieger, and the ninth and tenth by DeKoninck. According to Griffiths sardinine has the formula $C_{11}H_{11}NO_2$.

FERMENTS, FERMENTATION.

Fractional Fermentation—The Amyloïns (*Maltodextrins*).—G. H. Morris and Y. G. Wells. Starch transformations and beer worts of known optical activity and cupric reducing power were fermented with yeast, fractions being removed at intervals and the amounts of alcohol estimated in them; the alterations in optical activity and cupric reducing power were also noted. Practically the whole of the malt extract sugars are fermented in the first 48 hours, and after this, the three estimations give identical results as to the amount of fermented matter calculated as maltose. Subsequently, that is, during the secondary fermentation, when all the free maltose has been removed, the quantity of alcohol formed and the optical activity indicate a larger amount of maltose than does the cupric reducing power. The authors assume that the amount of copper oxide reduced by any amyloïn, is proportional to the quantity of combined maltose which it contains, whilst the amount of alcohol produced corresponds with the free maltose resulting from the hydrolysis of the amyloïns by the yeast. Interesting results were obtained with two varieties of pure yeast, namely, Saaz yeast and Frohberg yeast; the former ferments about one-seventh less matter than the latter.—Trans. Inst. Brew., v., 133; Jour. Chem. Soc. (Abs.), 1894, 223.

Animal and Vegetable Ferments.—W. B. Thompson gives a thought in comparing these ferments in their analogy.—Amer. Jour. Pharm., 1894, 224.

Diastatic Action.—From the researches of Effront, it appears that aluminum salts, phosphates and asparagine favor the action of the ferment. Whatever the temperature of conversion be, this influence is always noticeable. But the action stops as soon as the degree of hydration has become very great. It appears, therefore, that the same substances which favor the development of organized ferments also favor the action of soluble ferments. Whatever the nature of this action is, it is possible that the mechanism is the same in both cases. Mineral salts, and, perhaps, certain nitrogenous substances, can enter into combination in some special way with carbohydrates and albumen, so that the unstable compounds formed easily undergo hydration, oxidation, or further decomposition. The *role* which certain inorganic salts play in organic synthesis, as discovered by Friedel and Kraft, may, perhaps, be similar to that in these peculiar ferment actions.—New Eng. Drug., 1894, 137.

Ferment in Capers.—L. Guignard finds that the existence of special ferment cells is general among the Capparideæ. By their morphological characters in the root and stem they resemble those found in the same organs in the Cruciferæ, while, in the leaf and flower of the caper plant (Capparis spinosa, L.), they are grouped in a peculiar manner. The reactions of the cell contents are identical with those of myrosin. It is in capers that the ferment cells are most numerous, and the glucoside, of which the decomposition takes place in the same manner as in the Cruciferæ, is most abundant. The ferment present exists chiefly in the flower and the pulp of the fruit. The seed, on the other hand, in all the Capparideæ, is relatively poor, both in ferment and glucoside, what is found of the former constituent being in the embryo.—Comp. rend., cxvii, 493.

Presence of Vegetable Trypsin in Fruit of Cucumis utilissimus.—J. R. Green. Ferments which dissolve coagulated albumen are rare in the vegetable kingdom. To the few authentic cases (the pepsic ferment of the fruit of Carica papaya, the papaïn of Würtz and of Vulpian, and the latex of the common fig-tree), the author has added a pepsic ferment found in germinating Lupin seeds, and now calls attention to one found in the fruit of Cucumis utilissimus, Roxb., a plant indigenous in India. The juice of this fruit dissolves boiled white of egg; the boiled juice has no such power. It does not depend on microbes, since the addition of thymol does not prevent the action. Salt water dissolves out more of the ferment than pure water. The author believes the ferment to belong to the globulins or allied bodies. Like papaïn, it resembles trypsin rather than pepsin, and is more active in presence of bases than in neutral or acid media; the products of its action on coagulated albumen are first peptone, afterwards leucine.—Ann. Agron., 1893, 509; Jour. Chem. Soc. (Abs.), 1894, 63.

Ferment in Fungi.—E. Bourguelot shows that numerous fungi contain a soluble ferment which possesses the property of splitting up amygdalin, salicin, coniferin; and, though he is not yet able to prove its identity with the emulsion of almonds, it acts in the same manner and upon the same compounds as the latter substance.—Pharm. Jour. Trans., 1893, 263; from Compt. rend., cxvii., 383.

Inulase and the Indirect Fermentation of Inulin.—E. Bourguelot finds that, under the influence of inulase, the inulin of Atractylis gummifera is completely hydrolized, and that the glucose formed is solely laevulose.—Jour. Pharm. Chim., 1893, 5.

Koji, a Japanese Ferment, has recently been studied by Schrohe, Liebscher, and Majerstein, who have patented a process for manufacturing it, which is free from the objectionable features of the Japanese method. It is stated to be capable of producing 18 per cent. of alcohol from an ordinary mash.—West. Drug., 1894, 176.

Moto, a Native Ferment.—Prepared from koji 40 per cent., and starch paste 60 per cent., added to an equal volume of water. The use of these substances is stated to result in an economy of malt.—Ibid.

Papain Digestion—Some Notes on.—S. Rideal has carried out some experiments to show that there is considerable difference in the products formed when the conditions are varied.—Pharm. Jour. Trans., 1894, 845.

Papain.—F. Davis describes the results of experiments on the digestive action of papain, the general conclusion being that it is active in neutral or weakly alkaline media, but that its action is entirely stopped by the presence of hydrochloric acid to the extent of 0.05 per cent.—Pharm, Jour. Trans., 1893, 207.

——— It is found by Sittman (Münch. med. Wochen., xl., 548) that one Cgm. of papain suffices to change ten Gm. of coagulated white of egg, mixed with one hundred C.c. of water at a temperature of 40° to 45° C., into an opalescent milky fluid in the course of two hours, no free albumen remaining. The action is the same, whether the medium be alkaline or faintly acid. Taken in doses of three to five Cgm., made into a thin paste, directly after each meal, when the large proportion of albuminous matter was consumed, cessation of pain is said to have been caused in acute gastritis after two or three doses.

——— Hobein (Pharm. Zeit., xxxix., 386) states that the papain met with in trade is of two kinds, the one active only in alkaline liquids, while the other one is active in acid liquids. The peptonizing action in acid liquids takes place more readily when 0.2 per cent. hydrochloric acid is used, and in such an acid liquid a dilute solution of papain is more efficacious than a more concentrated solution. The effect produced is lessened when the amount of acid is increased or reduced, and it is increased by a rise of temperature to about 60° C. In alkaline liquids the action is still more effectual, and the strength most favorable to it corresponds with 0.1 per cent. of caustic soda. In a solution of sodium carbonate of equivalent strength there is very little action, especially upon fibrin. Judging from experiments made with papayotin prepared from the fresh juice of Carica papaya, it is inferred that those preparations which act only in alkaline liquids contain pure papayotin, and that those which are active in acid liquids are mixed with pepsin. That view is certainly opposed to the observations of Willmack, Hansen, and other investigators, who have all confirmed the action of the plant juice in acid liquids, and the precipitate taken for pepsin by Hobein would probably contain a considerable proportion of peptone. It remains for further investigation to ascertain a satisfactory means of detecting the presence of pepsin, and of deciding the question whether the papain preparations which are active in acid liquids really contain an admixture of pepsin, or whether the juice of the plant contains different ferments which act differently.

Papain and Pepsin.—D. B. Dott concludes that papain has only a slight solvent action on albumen at the temperature of the body, and practically no peptonizing action. On the other hand, pepsin has a high power, both of dissolving albumen and peptonizing the solutions. The higher temperature of 130° F. (as in the B. P. test for pepsin) increases the rapidity both of the solvent and peptonizing power of pepsin, and likewise increases the solvent power of the papain. Certain assumptions are made: first, that the pepsin and papain of two well-known makers are what they are represented to be; second, that non-precipitation by nitric acid is a trustworthy indication of the formation of peptone.—Pharm. Jour. Trans.; Bull. Pharm., 1894, 229.

——— A writer in the *Medical Press* observes that although papain and pepsin are employed for similar purposes, they act under totally different conditions. It is impossible, therefore, to guage their value under any one set of conditions, the vegetable ferment being obviously calculated to deal with a different class of albuminoid substances to those found in the animal body. The term "papain," it is urged, should be restricted to preparations of the papaw juice from which all irritating principles have been carefully eliminated. Though papain is unlikely to affect the position of pepsin in the therapeutics of gastric indigestion, it is suggested that in certain cases it may displace or serve as a useful adjunct to the animal ferment.

Papain Digestion.—Gordon Sharp (Pharm. Jour. Trans., 1894, 633 and 757) makes a comparison between egg and meat albumens for testing digestive ferments and forming peptones. Egg albumen is to be preferred because it is easier to obtain of necessary purity, and is more difficult of digestion. Egg albumen forms a hard, opaque coagulum, while meat albumen forms a softer, transparent coagulum, more readily acted upon by ferments, but either may be dissolved by an acid or alkaline solution of the ferment without the formation of any appreciable amounts of peptone. Very little is known of peptone and albumens, and he suggests that these may not be albumens at all, but albuminates. Egg albumen is thought to be albuminate of calcium, and is, therefore, more soluble in salt and acid solutions. This would also account for the solubility of mercuric albuminate in sodium chloride solution—calcium chloride and sodio-mercuric albuminate being formed. Meat albumen is thought to be sodium albuminate and analagous to gelatin, which is sodium gelatinate, hence it is more soluble and the solution is clear. By action of the ferments proteose is chiefly formed and not much true peptone. Peptone may be separated, when formed, by dialysis, but is liable to error in the use of a hastily-washed membrane, or in the action of alkalies upon the membrane, or through too long continued dialysis when the less diffusible proteids may pass through.

Lævolactic Ferment of the Pear.—George Tate isolated a bacterial organism producing marked lævolactic fermentations of dextrose and mannitol in the course of observations on the nature of the micro-organisms which attack the ripe pear. The organism is anaërobic and characterized by forming two kinds of growths upon solid media—a white growth of moist appearance, consisting chiefly of rods and cocci, and a tough, tapioca-like growth, consisting of ascococci.—Jour. Chem. Soc., 1893, 1263.

The Rennet Ferment in Plants.—J. R. Green reviews the subject of ferments resembling the rennet of animal organism, and adds to the same his own observations.—Annals of Botany, 1893.

Action of Sodium Fluoride on Rennet.—Arthur and Huber stated that sodium fluoride arrested the action of all vital fermentations (fermentations consequent upon the development of living organisms), while it was without influence upon chemical fermentations (those produced by soluble ferments, such as invertin, trypsin, emulsin, pepsin, etc). Freudenreich has, however, gone over the work of these authors and reports that while true in the main, there are certain exceptions to the latter rule. He cites more especially rennet among the latter, and states that the addition of 1 part of sodium fluoride to milk prevents the curdling effects of rennet completely, even when the latter was used in amounts which curdled milk that had not been treated with the fluoride in less than ten minutes.—Nat. Drug., 1893, 58.

Soluble Ferments.—J. R. Green has gathered together the views of to-day on the ferments, enzymes or zymases existing in plants.—Ann. agron., Aug. 25, 1893; Jour. Pharm. Chim., 1893, 523.

——— in Pencillium glaucum. E. Gerard.—Jour. Pharm. Chim., 1893, 11.

——— Trehalase, a new soluble ferment by Gerard.—Ibid., 497.

MICROSCOPY AND PHARMACOGNOSY.

Practical Pharmacognosy.—Articles intended for the student who has not attended a school of plant anatomy. *Cell Contents* and *Isolated Structures:* starch, crystals, glands and spores.—Pharm. Jour. Trans., 1894, 601.

——— Systems of tissue; reactions of lignin, quassia, guaiacum, logwood.—Ibid., 957.

——— Editorial in Pharm. Jour. Trans., 1893, 390. (Also, ibid., 401.)

——— *Discussion Relating to.*—Ibid., 391.

Pharmaceutical Microscopy.—J. Austen, in Pharm. Jour. Trans., 1893, 413.

Technique of the Modern Microscope.—W. Kaiser writes upon the living object.—Pharm. Post, 1894, 209.

Pharmacognosy—Its Scope and the Methods of Teaching It.—J. O. Schlotterbeck, in Pharm. Era, 1894, 250, 344, 396, 505. An account of the instruction in pharmacognosy in the School of Pharmacy, Univ. of Michigan.

Microscopy and Microscopical Examinations and Methods.—Report on the progress during 1893 by T. F. Hanausek, in Chem. Zeit., 1893, 1284. This is a thorough and comprehensive review.

Microscopy and Microscopical Technique.—A record of the progress in Chem. Zeit., 1893 and 1894 (Repertorium).

A New Pocket Microscope.—L. E. Sayre. Illustration and description in Meyer Bros. Drug., 1893, 289.

Value of Low Amplification.—The lower the amplification the larger the view of the object, and *vice versa*.—F. L. James, in Nat. Drug., 1893, 172.

A Symmetrical Aplanetic Objective.—C. V. Zenger's lenses have the advantage of correcting: 1. The exact achromatism for the entire length of the spectrum. 2. The astigmatism to a great degree. 3. They reduce the spherical aberration for a suitable aperture to the minimum value of one second of an arc. 4. They absolutely correct the curvature of the field.—Compt. rend., Feb., 1894.

Litharge Glycerin Cement.—F. L. James prepares the following cement: Place litharge (in an impalpable powder) in a crucible and expose to a bright red heat for some time. Keep this powder in closely-stoppered vessels. When needed for use, mix with sufficient anhydrous glycerin to make a paste, and with the paste quickly form the cells by the aid of a pen-knife and the turn-table, using the latter as a potter's wheel is used, forming up the sides of the cell by gentle pressure from the knife blade. This cement hardens very rapidly, resists almost all fluids, even mineral acids, and does not shrink appreciably in drying. It is not affected by any degree of heat short of the boiling point of glycerin. It adheres most firmly to any surface to which it may be applied, and can thus be used for cementing almost all kinds of substances, metal, porcelain, glass, etc. Only a small amount of the litharge and glycerin should be mixed at a time.—Nat. Drug., 1893.

Cement for Finishing Slides.—T. Lisle (Jour. Micros.), Meyer Bros. Drug., 1894, 39.

To Sterilize New Cover-Glasses.—Lettnow (Centralbl. für Bakteriol. u. Parasit., Bd. xiv, No. 2, 3, p. 63) has found it best after having cleansed them, to place them upon a piece of sheet-iron, some three or four inches square, held for several minutes over the flame of a Bunsen burner. Thus treated, the glasses will not break. A dozen or fifteen can be sterilized in this way at one time. A copper plate will not answer, as the copper oxide developed by the heat would combine with the glass.

Substitute for Glass for Covers and Slides.—Edwards suggests the employment of celluloid.—West. Drug., 1894, 19.

Fixing Microscopic Objects on Slides.—J. Tempère (Micrographe préparateur), applies to the particular part of the surface of the latter, after warming (at about 40° to 50° C.) to remove all traces of moisture, a drop of a medium prepared by dissolving on a water-bath 15 Gm. of white lac in 100 Gm. of absolute alcohol, and decanting off the clear liquid after standing awhile. As the alcohol evaporates from the warmed surface of the glass a hard transparent coating is left. This may be slightly softened at any time by means of a drop of oil of lavender, and after arranging the objects the heat of a spirit lamp will cause the oil to evaporate, leaving them firmly attached. Objects may be mounted on cover glasses in a similar way. A resinous mounting medium may then be employed in the usual manner. If glycerin or glycerin jelly be the mounting medium used, collodion diluted with two or three times its volume of oil of lavender may be found preferable as the fixing agent. The sections, etc., should be placed in position before the preparation dries, and the oil evaporated at a temperature of about 50° C.—West. Drug., 1893, 274.

Softening Drugs for Cutting.—In studying the minute structure of drugs it is always advisable (Pharm. Journ., 1894, 853), to cut sections of the dried material for examination, as in this way only can the whole of the cell contents be seen in their original situation as modified by the desiccating process. But for the purpose of a detailed study of the different tissue elements, it becomes necessary to soften the drugs so as to permit of their being cut in any direction desired. The method usually employed is simply to soak the roots, barks, etc., in water, or very dilute ammonia, glycerin, or spirit. A preliminary soaking in strong spirit (methylated) serves to remove excess of resin, and so prevent spoiling the razor edge. The material may then be transferred to a mixture of equal parts of spirit, water, and glycerin, which exercises a joint softening and preservative influence. Water-soaked drugs may also be preserved in this medium for any length of time; and if on removing any pieces they appear too soft, a proper consistence is readily restored by a longer or shorter immersion in strong spirit. Much more satisfactory results are obtained, however, by allowing the tissues to absorb water more slowly than is the case when immersed. A very good plan is to lay the drugs on an elevated metal frame standing in a soup-plate containing water, and cover the whole with a glass bell-jar; or they may be wrapped in moist blotting-paper and similarly covered, to prevent evaporation; whilst very small pieces may be efficiently softened by enclosing in a suitable small vessel with a piece of wet sponge. In this manner the tissues will approximate to their original condition with the least possible interference with the cell contents. Another method that has been suggested, which would probably be advantageous when time is limited, is to expose the drugs to warm aqueous vapor or condensed steam. It would be desirable in this case to guard against an excessively high temperature, otherwise tumefaction of the starch grains present in the tissues might occur, as well as partial disintegration of the tissue elements.

Hardening by Formaldehyde.—W. M. Eccles compares the hardening action of formic aldehyde on tissues with that in general use. Absolute alcohol, he points out, hardens most tissues in four or five days, but is apt to render them brittle, or hardens them very unequally. Methylated spirit requires about a fortnight to act satisfactorily. Chromic acid, with or without alcohol, hardens in about a week, but also renders tissues brittle; and potassium dichromate in Müller's fluid, though giving good results, requires often as long as six weeks, and must be renewed many times before the process is completed. Finally, mercury perchloride, which hardens rapidly, interferes with the subsequent staining processes. In the case of formic aldehyde very soft varieties of normal and pathological structures, the most difficult ones to prepare, were all hardened well in three days. None of the tissues became brittle, all being easily cut in an ether-freezing microtome after soaking in gum, and all stained well with logwood and eosine. At the same time the cells were unaltered in shape or character. For very soft tissues a 40 per cent. solution is preferred; for firmer ones 20 per cent. suffices, and for quite firm material 10 per cent.—Brit. Med. Journ., 1743, 1124.

Sectioning Fern Prothalia and Other Delicate Objects.—W. B. Thomas. The Microscope, 1893, 167.

Microtome Knives and Their Care.—An illustrated article by Bausch and Lomb.—West. Drug., 1894, 133.

Simple Microtome.—A microtome for all ordinary purposes may be constructed with the expenditure of a little time and trouble by any one possessing some knowledge of soldering, glass-blowing, etc., is described by J.

A. Forret, in Brit. and Col. Drug.; Amer. Drug. and Pharm. Rec., 1894, 148.

Microtome for General Practitioners and Pharmacists.—G. Sharp describes and illustrates (Pharm. Jour. Trans., 1893, 301) one that is cheap, and may be made by any joiner.

Mounting Sections in Canada Balsam.—Modification of Cole's Method.

After the section has been properly cut and stained it is directed to be cleared by floating in oil of cloves for about five minutes, and then transferred to turpentine. The Canada balsam should have been previously prepared by dissolving three ounces of the dried balsam in three fluidounces of pure benzol and filtered. A glass slide having been breathed upon, a clean cover-glass is applied to the moistened surface so as to adhere to it. The difference in the result may be very slight or even nothing, but it is just possible that by first spreading the section on the cover and then covering it with the medium it may be left closer to the cover in the finished slide, and so be more advantageously placed for examination with high-angled objectives, which have correspondingly short working distances. The risk of air bubbles in either case is extremely slight.

The slide is afterwards covered with a bell-glass, or otherwise protected from dust, and left for twelve hours for the benzol to evaporate. A drop of fresh benzol-balsam is then added to that enclosing the section, the cover inverted by means of a pair of forceps, and lowered on to the middle of a clean slide that has previously been gently warmed in a spirit-lamp flame. If the cover be lowered carefully and gradually, any air bubbles that may have formed will escape easily, and the cover may then be pressed steadily until the section lies quite flat and uniform. As soon as the slide is quite cool any exuded balsam may be washed off with a soft rag or camel's hair-brush moistened with methylated spirit, and, after a final polish with a dry cloth, a ring of cement may be applied to finish. Thus, though some time is required for the balsam to harden in the preliminary stage of this process, that is much more than compensated for by the rapidity with which the slides can be finished off. In the ordinary so-called quick method the slides must be left for a day or two, or even longer, before it is safe to attempt to clean and ring them, and there is always a risk of moving the cover or admitting air bubbles at the last moment.—Pharm. Jour. Trans., 1894.

Label Paste for Slides.—F. L. James (Nat. Drug., 1893, 6) recommends the following: Dissolve four ounces of picked gum arabic in 8 ounces of water. In another vessel make a paste with 1 ounce of gum tragacanth in 4 ounces of water. Mix the solution and the paste and strain the mixture through a linen handkerchief. To the colate add 2 ounces of glycerin, in which has been dissolved 30 grains of corrosive sublimate, and mix well.

Thus prepared, the paste will keep almost indefinitely, and it will stick paper to almost anything. Some slides labeled with it several years ago still retain their labels firmly attached, while the labels put on with gum arabic, dextrin, etc., have all loosened.

Photomicrography.—Article dealing with the manipulations, etc., connected therewith.—A. Lander, in Pharm. Jour. Trans., 1894, 1053.

REAGENTS AND STAINS.

Staining Vegetable Tissue for the Microscope.—A. Flatters considers staining with logwood, picro-carmine, borax-carmine and iodine green; decolorizing and clarifying with formulas for the above.—Montreal Pharm. Jour., 1893, 170; Drug. Circ., Feb. 1894.

Aniline Stains.—S. E. Jelliffe considers the solvents and properties of the aniline stains.—Amer. Drug. and Pharm. Rec., 1894, 347; from Amer. Monthly Micros. Jour., 1894.

Double Staining—New Process of.—L. Rhumbler recommends a solution consisting of 50 parts (? C.c.) each of a 1 per cent. aqueous solution of methyl green; a solution of eosin, 0.8 Gm., in 50 per cent. alcohol, and absolute alcohol. The stain is said to act on material preserved in alcohol or picro-sulphuric acid in half an hour, substances that were living when preserved staining a brilliant red, whilst others acquire a bright green color.—Zool. Anzeig., xvi., 47; Pharm. Jour. Trans., 1893, 361.

Nature of the Staining Process of Vegetable Tissues.—It has long been a matter of controversy whether the coloring of cellulose fibers by staining reagents is dependent on a chemical process, or merely on a mechanical union of the particles of the pigment with those of the cellulose. G. Spohn has attempted to set this question at rest by a careful microscopical examination of cotton-wool stained by mineral pigments. He found no change whatever in the structure of the fiber itself. Even when the fibers were macerated before staining with alizarin, they acted simply as a carrier of the pigment, on which the macerating fluid acts chemically. In all cases, according to these observations, the combination of the pigment with the fiber depends entirely on purely mechanical causes (Dingler's Polytechn. Journ., 1893, Heft. 9).—Pharm. Journ., 1893, 163.

Aniline Stains.—A general recipe for these stains, recommended by Hermann and said to serve equally well for safranine, gentian violet, eosine, fuchsine, fuchsine S, dahlia, and orange G, is as follows: Staining substances (dry), 1 Gm.; absolute alcohol, 10 C.c.; aniline water, 90 C.c. As thus prepared, anilines are said to stain very intensely and sharply. Washing out should be done in absolute alcohol, though with safranine acid alcohol may be used. The solutions require to be used fresh, as they do not keep very long.—Nat. Science, iii., 121.

Bleaching Sections.—E. Minchin describes a new method of bleaching histological sections before staining. Place the sections in a bottle of 80-per-cent. alcohol, having a layer of potassium chlorate crystals at the bottom. Then cautiously add a few drachms of concentrated hydrochloric acid, and subject the bottle to a gentle heat. The chlorine evolved is said to bleach sections in about an hour.—Nat. Science, iii., 121.

Carmalum is the name applied by P. Mayer (Nat. Science, iii., 113,) to a staining fluid intended for histological purposes. It is prepared as follows: 1 Gm. of carminic acid is placed into a suitable vessel, together with 10 Gm. of ammonia-alum and 200 C.c. of distilled water. The mixture is then heated nearly to the boiling point until solution is effected, and, after cooling, carefully decanted or filtered, when it is ready for use. The addition of a small crystal of thymol is said to keep the solution free from organic growths. It is a dark-red liquid of great staining power, and, it is claimed, will stain objects satisfactorily that have been fixed in osmic acid. It is said to tinge the protoplasm slightly, as well as the nucleus.

Chloral-Carmine is the name applied by A. Meyer (Ber. d. Bot. Gesell.) to a staining fluid prepared by heating together on a water-bath for half an hour 50 Cgm. of carmine, 20 C.c. of absolute alcohol, and 30 drops of hydrochloric acid (sp. gr. 1.124), then adding 25 Gm. of chloral hydrate, and filtering after cooling. The solution thus obtained is ready for use; it stains the nuclei of pollen grains an intense red in ten minutes, and serves also for the nuclei of pollen tubes grown on gelatin.

To Render Dammar Colorless.—It is stated (Inter Journ. of Micros., 1894, 200,) that dammar resin may be decolorized by dissolving it in benzene and clarifying the solution by filtration through paper in a closed vessel, or by agitation with zinc oxide, which, on subsiding, carries all foreign matters to the bottom. The resin is afterward precipitated from the clear solution by adding alcohol. After washing the precipitate two or three times with absolute alcohol it is dried, and the resulting white powder is redissolved in pure benzene, when a practically colorless solution results. A tendency to brittleness in the layer of resin left on evaporation of this solution is counteracted by the addition of a little poppy oil. The residual alcoholic mixture leaves, on evaporation, a tenacious and slowly drying residue, which is said to be an excellent basis for cements,

Solution of Hæmatoxylin.—S. H. Gage, supposing that the dark deposit forming in aqueous solutions of hæmatoxylin might be due to the action of living ferments, prepared a solution of the following composition, and recommends it for its keeping properties: Hæmatoxylin, 0.10 Gm.; chloral hydrate, 4 Gm.; potash or ammonia alum, 7.5 Gm.; distilled water, 200 C.c. The water and alum should be boiled together for five to twenty minutes to effect sterilization, and the other ingredients then added. After keeping for six months no deposit had formed, and the staining action was unaffected.—Proc. Amer. Micr. Soc., xiv., 125, through Journ. R. M. S.

Lignin Color Test.—Lignin chemically belonging to the class of aldehydes led E. Nickel to test its behavior towards phenylhydrazine. The wood to be tested is moistened with an aqueous solution of phenylhydrazine hydrochlorate; the wood takes a yellow color which is intensified by the addition of dilute hydrochloric acid; in the course of an hour's standing the yellow color of some woods is changed to a pure green, others require longer standing.—Chem. Ztg., 1893, 1209.

Ruthenium Oxychloride and Ruthenium Red.—Ruthenium Oxychloride, $Ru_2(OH)_2Cl_4$, is a black powder, which dissolves in absolute alcohol with a blue color, and the formation of the so-called "Ruthenium Red," $Ru_2(OH)_2Cl_4(NH_3)_7+3H_2O$. The latter according to Mangin (Merck's "Bericht 1893," 76), is excellently adapted for staining microscopical preparations, and is the best microscopical reagent for pectins and their transformation-products—vegetable mucus and gum; and it is also serviceable for staining animal tissues and bacteria. It is employed in 1:5000–1:10000 aqueous solutions, which should be preserved in dark-colored bottles, since light reduces them. For nuclear staining, acetic acid is added to these solutions.—See Compt. rend., cxvi., 653.

Liquid Vaseline in Microscopy.—A. Gawalowski proposes to replace cedar oil by a vaseline oil with refractive index 1.4.—Rund. f. Pharm., 1894, 197; Rep. de Pharm., 1894, 224.

Staining Connective Tissue.—Beneke's modification of Weigert's method for staining fibrin, by means of which the connective tissues of the most diverse organs can be consistently stained. Portions of tissue that has been fixed in alcohol, having been embedded in paraffin and cut, the sections are attached to slides in the usual way and stained for ten to twenty minutes with aniline gentian violet (aniline oil 10 parts, well shaken with water 100 parts, then filtered, and concentrated alcoholic gentian violet solution 5 to 10 parts, added to the filtrate). Afterwards treat for one minute with lugol solution of a port wine tint, dry with filter paper, and decolorize with aniline xylol (aniline oil, 2 parts, xylol, 3 parts). Decolorization having been stopped at the right point, which must be judged from experience, mount the sections in xylol balsam. The fibres of the connective tissue should appear stained various shades of violet.—Centralb. f. allgem. Path., through B. M. J. Epit., p. 40.

Vegetable Tissue—Preparation of, for the Microscope.—A. Flatters describes the operations of staining, decolorizing and preparing vegetable tissues. Also the method of mounting celloidinized sections and preparing sections having cutin.—Pharm. Jour. Trans., 1893, 17; from Annual Report of Manchester Micros. Soc., 1891.

——— *for Section Cutting.*—Hardening by a saturated solution of picric acid in methylated spirit. Adding mucilage of acacia and freezing with ether.—G. Sharp, in Pharm. Jour. Trans., 1893, 361.

Micro-chemical Test for Iodine.—Denigès makes the solution to be tested slightly alkaline with potassium hydrate, then adds a drop of acetone and a little Javelle water. Traces of iodine are in this manner readily detected by the separation of crystals of iodoform. Iodates should be previously treated with a little sodium thiosulphate.—Jour. Pharm. Chim., 1893, 499.

Micro-chemical Detection of Iron.—Lemberg (Zeit. Deut. Geol. Gesell., xliv., 823). Addition of $(NH_4)_2S$ to a granule of soluble substance on a microscope slide—black = FeS. The formation of a black sulphide is, however, not distinctive for Fe. On removing the excess of $(NH_4)_2S$, and adding a drop of concentrated aqueous solution of potassium ferricyanide, the black FeS is converted to Turnbull blue in about 8 minutes.

Pectic Substances—Identification of.—L. Mangin recommends to wash the sections with acetic acid (1.5 per cent.), then neutralize and treat with a mixture of naphthylene blue R and acid green. The pectic compounds are stained violet by the former, whilst lignin and suberin fix the green stain. By acting on small pieces of tissue with dilute hydrochloric acid, or a mixture of acid 1 part and alcohol 3 parts, pectic acid, if present, will be separated from the base (usually lime) with which it is combined. It is quite insoluble in water, but may be dissolved by the action of a weak alkali and then precipitated in gelatinous flakes by a weak acid. Pectose is found associated with calcium pectate, but is not readily isolated, remaining behind after the action of the alkali.—Jour. de Bot., vi., 363.

Starch Grains.—Mounting Medium for.—A. Geoffroy uses the following for mounting starch grains, algæ, the lower fungi, etc.: gelatin, 3 or 4 Gm. is dissolved in 100 C.c. of a 10 per cent. solution of chloral hydrate. Preparations stained with carmine or iodine-green retain their color for a long time in this medium.—Jour. de Bot., vii., 55.

Measurement of Starches.—To ensure accuracy in identifying and comparing starches it is essential to measure the grains, besides having a fair idea of the limits of size within which particular starches may vary. Both stage and eye-piece micrometers are needed for measuring, the former being divided to 0.1 and 0.01 Mm., and serving to determine the value of the spaces between the lines—ruled to 0.1 Mm.—on the glass disc that is dropped into the eye-piece. The actual work of measurement is performed with the eye-piece micrometer, and since the value of the divisions on this varies according to the power of the objective and eye-piece used, as well as with the length of the microscope tube, it is necessary to note these factors carefully if accurate results are desired. Thus with a tube length of 160 to 180 Mm., a one-sixth inch objective, and B eye-piece, the value of one division on the eye-piece micrometer, as determined by the stage micrometer, would probably be about 3 micra (a micron, μ =

0.001 Mm.). It will be found to save much time in calculating to so adjust the tube length that the value of the divisions may be represented by a whole number. A note should then be made of this value, together with particulars of the tube length and lenses used, so that, by always observing the same conditions, all observations may be referable to a common standard. A magnification of about 250 diameters will be found best in examining starches, and it should be a rule to obtain actual, not average, measurements. The latter vary considerably, as noted by different observers, as will be seen in the following table, the length being given in micra in each case :

Kind of Starch.	According to Weisner, Höhnel, Wagner.	According to Tschirch.	According to Muter.
Potato	60.0	56.0	37.6 to 67.6
Wheat	6.8 to 28.0	6.0 to 33.0	2.3 to 47.0
Maranta	27.0 to 54.0	32.0 to 46.0	32.8 to 37.6
Pea	32.0 to 79.0	29.0 to 39.0	18.8 to 28.2
Rice	5.0	5.0 to 6.0	5.0 to 7.7

There seems to be no definite rule observed as to the manner in which the average size should be taken, and it is much preferable to note the sizes both of the largest and smallest granules observed. A large number of different samples of each starch should be examined, and each one ought to be well stirred before specimens are taken, so as to ensure them being thoroughly representative of the bulk.—Pharm. Jour. Trans., 1893, 362.

Anatomical Modifications in Plants.—W. Russell finds that plants growing in the Mediterranean district differ from the same species found in the neighborhood of Paris in the following respects : the cells of the epidermis are larger, more regular in outlines, and have thicker walls ; the assimilative tissue of the bark predominates over the chlorophyll-free parenchyma, and the latter is transformed into protective tissue ; there is an increase in the diameter of the vessels, and the leaves become augmented in thickness by the great development of palisade tissue.—Comp. Rend., cxviii., 884.

Histological Examination of Drugs.—

Canella Alba.—See Canella Alba.

Ipecacuanha.—See Ipecacuanha.

Jalapa.—See Jalapa.

Matico.—See Matico.

Sarsaparilla.—See Sarsaparilla.

Senna.—See Senna.

Histological Examination of Some Little Known Barks.—E. Heermeyer (Pharm. Post, 1893, 453) describes 13 rare plants.

ADULTERATIONS.

Spices and Their Adulterants.—T. F. Hanausek reviews the investigations made during 1893, on ginger, cinnamon, cloves, saffron, star anise, vanilla, cardamom, pepper, mustard and mace.—Chem. Zeit., 1894, 723.

Impurities, Substitutions, Adulterations and Inferior Qualities in Drugs.—Th. Waage considers the following: Amylum marantae, asafoetida, cloves, castor, cortex aurantii fructus, cascarilla, cortex chinæ, cinnamon, rhamnus purshianus, crocus, cubeba, flores pyrethri, coca, myrtillus, thea, anisum stellatum, cardamomum, juniperus, gum arabic, gutta-percha, herba asperulæ, conium, kamala, caoutchone, lignum juniperi, macis, opium, piper, ipecacuanha, hydrastis, areca, myristica, caffea, cola.—Bull. Pharm., 1894, 15.

Examination of Commercial Drugs.—During the months of October and November, the Board of Health of Massachusetts examined 137 samples of drugs, and of these 45 were found to vary from the pharmacopœial standard, including citrate of iron and quinine, compound spirit of ether, dilute hydrobromic acid, powdered opium, spirit of juniper, tincture of iodine, tincture of opium, red and white wine, and whiskey. A "Diamond Lotion" was found to contain over 3 per cent. of mercuric chloride, or 14.7 grains per fluidounce.—New Eng. Drug., 1894, 167.

Drugs for Marylebone.—Blyth reports that during the year 511 samples were analyzed, and that amongst them were the following samples of drugs: Quinine, 4; citrate of iron and quinine, 3; seidlitz powder, 6; powdered rhubarb, 2; sulphur tablets, 1; sodium bicarbonate, 1; sweet spirit of nitre, 2; and that every one of these samples was found to be genuine.—Chem. and Drug., 1893, 237.

Adulteration in Canada.—MacFarlane says that a considerable number of samples of tinctures were found to be deficient in alcoholic strength, and it is reasonable to suppose that, as a consequence, they are defective as regards the extract they should contain, and the medicinal properties they should possess. According to the Adulteration Act every drug must be regarded as adulterated within the meaning of the Act, "if, when sold, or when offered, or exposed for sale under or by a name recognized in the British or United States Pharmacopœia, it differs from the standard of strength, quality or purity laid down therein." The following statement shows the number of cases challenged, and the manner in which they have been disposed of up to the present:

	In Quebec.	In Montreal.	In Ottawa.	In Toronto.	Total.
Challenged	5	7	6	9	27
Relieved on appeal	1	....	4	1	6
Relieved on payment of expenses	4	5	....	5	14
Settled on payment of these and the expenses of prosecution	....	....	2	1	3
Non-suited	....	1	....	....	1
Judgment obtained	....	....	....	2	2
Still in litigation	....	1	....	....	1
Total	5	7	6	9	27

—Amer. Drug. and Pharm. Rec., 1894, 90.

Adulterated Drugs.—Records of cases of detection and prosecution in Chem. and Drug., 1893–94.

Buying and Testing Drugs.—F. J. Wulling (Pharm. Era, 1894, 440), records mistakes found by him in the course of six years' business.

Adulteration of Cutch.—Chinese adulterate it by adding extracts from the barks of lein tonkyan and panya, which contain a considerable amount of tannin, but nevertheless render the cutch exported spurious and utterly worthless. The adulteration is easily recognized by local merchants thoroughly accustomed to the article, but it has been successfully passed on to consumers in other countries by unscrupulous vendors. The Forest Department and the Chamber of Commerce in Rangoon are both highly interested that the purity and good fame of Burmah cutch shall be beyond question, and the Chief Commissioner has now, on their earnest recommendation, proposed to levy a heavy tax on the manufacture of extracts used for adulteration-—Chem. and Drug., 1893, 134.

Ipecacuanha and Senega.—A. Andrée calls attention to an admixture of undulated ipecacuanha root (Richardsonia scabra), with senega root, in a parcel sent out by a New York house, the ipecacuanha being present in a notable proportion. The senega root is described as not presenting identical characters with the official article, being harder, more fibrous, and not possessing generally the keel by which the root is usually recognized. Portions of stem attached to the root were colored violet. Andrée suggests that the roots may possibly be obtained from a distinct species of Polygala, growing in the same districts as the Richardsonia and collected at the same time as the roots of the latter.—Apot. Zeit., ix., 23.

Spices and Condiments.—Part 2 of Bulletin No. 13 of the U. S. Department of Agriculture, Division of Chemistry, is devoted to a popular exposition of the origin of spices and the means employed for their adulteration, and contains as well an extended technical discussion of the subject and of the results of analysis both microscopical and chemical, and the methods which have been proposed by recent authorities for the detection of sophistication. The report is the work of Clifford Richardson.

Tea, Coffee and Coca Adulteration.—The Division of Chemistry of the U. S. Department of Agriculture gives the result in Bulletin No. 13, part 7, of investigations in the matter of adulteration of tea, coffee and coca, and contains the common known adulterants and some of the simpler means for detecting them.

A New Coffee.—A plant under the name of Maragoipe coffee from Brazil.′ A description of the plant, with its introduction, is given in Chem. and Drug., 1894, June. No examination of its properties or aroma has been made.

Pharmacists as Analysts.—Editorial on the resolution passed by the Seventh International Congress, concerning the pharmacist as an analyst. This is regarded as an aspiration rather than as an asseveration.—Amer. Drug. and Pharm. Record, 1893, 235.

Economic Botany.—E. S. Bastin directs attention to the possibilities that lie in the micro-chemical study of drugs. The methods of macro-chemical investigation are under such headway that creditable work is being done by them in chemical laboratories the world over; but only quite recently have micro-chemical methods risen to prominence. It is now possible, by means of the microscope, to recognize with certainty the presence of a large number of important medicinal constituents, including many of the alkaloids and glucosides. In many cases, to one skilled in the use of the microscope, it constitutes the simplest and speediest mode of analyzing a drug qualitatively. Among the glucosides that are recognizable by this means are coniferin, datiscin, frangulin, hesperdin, phloridzin, rutin, salicin and saponin; and among the alkaloids, aconitine, atropine, berberine, brucine, colchicine, corydaline, cytisine, morphine, narcotine, narceine, piperine, strychnine, theobromine, caffeine, veratrine and nicotine.

The microscope, in the hands of the intelligent pharmacist, is thus destined to become a much more important instrument than heretofore in identifying drugs, judging of their quality and detecting adulterations.—Amer. Jour. Pharm., 1894, 282.

MATERIA MEDICA (VEGETABLE) AND BOTANY.

Progress in Botany.—For complete reference to work treating upon systematic, anatomical, morphological and physiological botany, recourse must be made to the following journals also: Ann. of Botany; Bot. Centralbl.; Bied. Centralh., Chem. Zeit., especially Repetorium, Ber. d. Chem. Ges., Ber. d. Bot. Ges., Jour. Chem. Soc. (Abstracts), Chem. News, and others.

Herbaceous Plants in Common Cultivation, especially those connected with medicine.—Presidential address of O. Corder.—Pharm. Jour. Trans., 1893, 151.

Medicinal Herb Growing in Bavaria.—Chem. and Drug., 1894, 110.

The Berlin Sewage-Farm Drug-Cultures.—The experimental cultivation of medicinal herbs on the Berlin City Sewage-Farm has now been carried on for three years, but the results arrived at are only moderately satisfactory. Only the aromatic herbs, sage, marjoram, and tarragon, have proved profitable cultures. Russian (Sarepta) mustard grows well, but the seed is deficient in pungency and appearance. The experiments with angelica, levisticum, sunflowers, and belladonna, are to be continued for some time. The difficulty in the way of profitably cultivating the last-named, is that it cannot be dried easily.—Ibid., 568.

Drug Cultures in Ceylon.—Report of the Peradeniya Botanic Gardens.—Ibid., 757.

Dutch-East-Indian Plants.—P. C. Plugge (Apoth. Ztg., 1893, 90) describes the following therapeutically useful Dutch-East-Indian plants: 1. Cocculus laurifolius (Menispermeæ). A colorless, crystalline alkaloid has been isolated by Greshoff from the bark and leaves of the tree. Physiological investigation has shown that this coclaurine is a nerve-paralyzer. 2. Daphniphyllum baucanum, an arboraceous shrub (Euphorbiaceæ). It contains an alkaloid, daphniphylline, which has been proved to be a cardiac poison, causing diminution of frequency without preceding acceleration, irregularity of heart's movements, and, finally, arrest in diastole. 3. Isotoma longiflora (Lobeliaceæ) originates in Cuba, and occurs in East India in gardens or wild. It is an herb. The isotomin, isolated by Greshoff from the fresh herb, agrees physiologically in many respects with lobeline obtained from Lobelia inflata. It is also a cardiac poison, arresting the heart in diastole; it paralyzes the brain, but not—or much later—the spine.

Native Medicines from the Gambia.—J. H. Ozanne, in Chem. and Drug., 1894, 858.

Medicinal Herbs in Germany.—The principal centres of the cultivation of medicinal herbs in Germany are found in Thuringia (Kölleda, Jena-Lobnitz, Jena and Erfurt), near Scheeberg in the Saxon Erzgebirge, and around Schweinfurt, Nuremburg and Bamberg. The present area of the cultures is as follows: Near Kölleda about 85 acres are under peppermint (Mentha piperita), which gives an average yield of about 50 tons, worth about 2,200*l.* About 75 acres are under spearmint (Mentha crispa), 88 acres under angelica (crop 75 tons, value 350*l.*), 155 acres under valerian (V. officinalis), yield 150 tons, value about 1,750*l.;* 45 acres under levisticum, yielding about 25 tons of root. The chief product of the Juremburg and Schweinfurt cultures is althæa-root, of which about 15 tons are harvested yearly, and a very large quantity of minor "pharmaceutical herbs," such as sage, peppermint, spearmint, liquorice, wormwood, calamus, marjoram (the last-named largely used in sausage-making), mallow-flowers for dyeing, melissa, mignonette, &c. Tarragon is much grown for use in vinegar-making. The culture of so-called perennials is laborious, and requires much preliminary care, such as preparation of boxes (partly glass-covered), fresh manuring, and the admixture of fine forest soil. Most of the plants must be raised in nurseries, but may be planted out in the open air in the same year.—Ibid., 1893, 912.

Medicinal Plants of Java.—Greshoff considers Pangum edule, Hydrocarpus inebrians, Isotoma longiflora, Sterculia foetida, Nyctanthes arbor tristis, Pachyrrhiziis angulata, samadera indica, streblus asper, artocarpus rigida, Hura crepitans, Sesamum, Rhimacanthus communis.—Abstract in Chem. Zeit., 1893, 1389.

Phillippine Islands—Flora of.—Pharm. Jour. Trans., 1893, 350; from Consular Report.

Medicinal Plants from Sierra Leone.—Chem. and Drug., 1893, 21.

Medicinal Plants of Staten Island.—W. C. Alpers describes them in a popular way with illustrations.—Merck's Mark. Rep., 1894, 120, etc.

Geographical Distribution of the Simple Medicines.—G. Planchon considers in the paper the arctic and alpine regions.—Jour. Pharm Chim., 1893, 145.

Cultivation of Medicinal Plants.—P. Agnelli, in Pharm. Post, 1893, 497; Deutsch-Amer. Apoth. Zeit., 1894, 164.

Herbariums in Colleges of Pharmacy.—Canby herbarium has been acquired by the College of Pharmacy of the city of New York, and the Martindale herbarium has been secured by the Philadelphia College of Pharmacy. The deposition of these two important private herbaria where they will be maintained, and their growth continued in practical directions, is an important occurrence in the history of economic botany.

U. S. Forestry at the Fair.—J. Crawford discusses the things of interest in the forests and forest industries of the United States at the World's Columbian Exposition.—Amer. Jour. Pharm., 1894, 69.

The World's Columbian Exposition from a Botanical Standpoint.—Henry Kraemer reviews at some length the salient features of the botany of the World's Fair, and concludes that future expositions should have a more specific character.—Ibid., 80; Scientific American (Supplement), 1894, 15315.

Fair Forestry Outside of the United States.—J. Crawford continues his discussion on the forestry of the Fair at Chicago. This paper is confined to the exhibits of foreign nations.—Amer. Jour. Pharm., 1894, 124.

Botany for the Pharmacist.—F. C. Newcombe. Article on why the pharmacist, as a pharmacist, needs botany; how much of it he needs, and how he can obtain it.—Pharm. Era, 1894, 461.

Mucilage for Mounting Plants in Herbarium.—Glycerin, 4½ parts soft soap, 4½ parts. Dissolve 1½ part salicylic acid in 30 parts alcohol; shake thoroughly, and add to a mucilage made of 139½ parts gum arabic and about 270 parts water. This mucilage remains elastic when dried, and does not have a tendency to crack. Use parts by weight.—Chem. and Drug., 1893, 151.

Plants Employed in Catching Fish.—F. A. Flückiger.—Pharm. Post, 1893, 629. A historical account with enumeration of plants.

Chemical Analyses of Seeds.—E. Schulze considers the analysis of seeds for the important constituents.—Chem. Zeit., 1894, 799.

Estimation of Iron in the Ashes of Plants and Animals.—M. Ripper, in Chem. Zeit., 1894, 133.

Ash and Moisture in Drugs.—E. Dieterich's report for 1892.—Abstract in Chem. and Drug., 1893, 576.

The Role of Superstition in Therapeutics and the Formation of the Materia Medica.—A lecture by F. L. James.—Nat. Drug., 1894, 93.

NOMENCLATURE.

Use of Unauthorized Names for Vegetable Drugs and Medicinal Plants. H. H. Rusby writes of misleading names, indicates their origin, and remarks upon botanical nomenclature.—Alumni Jour., 1894, 10.

Revisio Generum Plantarum secundum leges nomenclaturæ internationales cum enumeratio plantarum exoticarum.—Otto Kunze. Part iii., Sec. 1., Leipzig, London, Milan, New York and Paris, 1893.

A consideration and collation of everything that has been written on nomenclature during the past 18 months. 124 authors are cited and their writings abstracted nearly in full.

A New Fashion in Writing Plant Names.—E. L. Greene. A discussion of the decapitalization of specific names and the omission of the comma between the name and the author cited.—Erythea, i., 138.

Generic Nomenclature.—H. Baillon.—Erythea, i., 116.

Views of a Working Botanist on the New American Rules of Nomenclature.—J. W. Congdon.—Zoe, iii., 339.

Botanical Nomenclature.—K. Brandegee.—Ibid., iv., 182.

Note on Nomenclature.—G. B. Ludworth.—Gard. and For., vi., 324.

Duplicate Binomials.—List from Karsten's Deutsche Flora.—N. L. Britten, in Bull. Jour. Bot. Club, 1893, 443.

Corrections in Nomenclature.—III. and IV. E. L. Greene. Erythea, i., 206 and 246.

Nomenclature of Botany.—P. Ascheron's views on the priority question.—Pharm. Zeit., 1894, 102; Pharm. Rund., 1894, 74.

Some Citations Needing Correction.—J. B. Davy, in Erythea, 1894, 48.

A New Code of Nomenclature.—Otto Kunze, in Bot. Gaz., 1894, 126.

Questions of Nomenclature.—John Briquet, in Bull. Herb. Boiss, 1894, 49.

Popular American Plant Names.—II. F. D. Bergen.—Bot. Gaz., 1893, 411.

West American Coniferæ.—J. G. Lemmon discusses the synonomy and nomenclature of the Monterey pine and the knob-cone pine, and concludes that the former should be known as Pinus radiata, Don., and the latter as P. attenuata, Lemmon.—Erythea, i., 224.

Another Side of the Nomenclature Question.—L. H. Bailey considers the relations to horticulture.—Erythea, ii., 10.

Euonymus—Spelling of.—Chas Rice. While there is apparently sufficient authority to adopt the spelling "Evonymus," if Linné's Species Plantarum (ed. of 1753) is made the basis, the form "Euonymus" is, orthographically, better supported, and is also more in harmony with the ordinary pronunciation of the word ("yoo-onymus") by English and American botanists. The form "Evonymus" is a phonetic concession to some of the modern languages.—Alumni Jour., 1894, 80.

INSECTS AND DRUGS.

Insects Injurious to Drugs.—L. E. Sayre continues his studies on this subject, and calls attention to the following: The mites found in raw sugar and cantharides; Ptinus brunneus in the larval stage found in allspice, capsicum and cinnamon; Anobium paniceum attacks agarics and other drugs; Lasioderma serricorne eats when a larva capsicum and dried tobacco; Bostrichus dactilliperda, found in sweet almonds; two species of Cutorhynchus infest poppy, etc.; Dalandria oryza, found in rice and ground roasted acorns. The genus Tinca affords a number of destructive species; Angoumis grain moth, in the caterpillar stage, attacks all kinds of stored grains; Carpocapsa amflana infests the apple and seeds of Corylus avellana, Juglans regia, and Castanea vesca. The larva of Myclois ceratonia feasts on the fruits of Ceratonia siligqu and Castanea vesca. The larva of Œcophaga oliviella inhabits the kernels of the olive. The latter is also infested by the larva of Dacus oleæ. The larva of the Hessian fly are found in fresh hazel nuts. Trypeta arnicivora in arnica flowers. Nicobium hirtum attacks peppermint, marshmallow, skullcap, wormwood and thorn-apple leaves, also found in capsicum, orris, ginger and condition powders. Anthrenus varius attacks fœnugreek. Silvanus surinamensis is found in almond meal. These observations show, first, that the most destructive insects are the beetles or sheathed-winged insects. With the exception of one moth and one mite, all the insects received at the University and mentioned in this article, are beetles. Second, that the greater part of the drugs attacked and destroyed are vegetables or vegetable products, and hence, that these need the greatest care and watchfulness. Third, that there is need of greater vigilance and more observation on the part of druggists, if these pests are to be successfully driven out. The paper is well illustrated, and treats of this matter clearly.—Amer. Jour. Pharm., 1893, 321.

POISONOUS PLANTS.

Poisonous Plants and their Poisons.—J. Guardia. The poisons of some of the plants of the Ranunculaceæ, Papaveraceæ, Leguminosæ, Rosaceæ, Cucurbitaceæ, Umbelliferæ, Loganaceæ, Solanaceæ, Scrophularineæ, Thymelaceæ, Euphorbiaceæ, Urticaceæ, Coniferæ, Amaryllideæ, Dioscoreæ, liliaceæ, Gramineæ, Fungi, and others.—Bull. Pharm., 1892, 542; Amer. Drug. and Pharm. Rec., 1893, 103, 149.

Acokanthera—Some Species of.—L. Lewin has examined the species of the genus acokanthera, with the exception of A. spectabilis, and has arrived at the conclusion that of the species hitherto placed in this genus, those which are poisonous, viz.: A. deflersii, Schw., A. schimperi, B., and H. and A. Onabaio, Cath., are characterized by a bitter taste, by containing a glucoside, and by giving a green fluorescence under certain conditions.

Acokanthera—Arrow Poisons of the Genus.—E. M. Holmes treats of Wanika arrow poison, the Taita, Teita or Swahili arrow poison and Wahinga, Wa-kamba or Murju arrow poison. It would seem that all of the species of this genus are employed in different districts of Eastern Africa as arrow poisons.—Pharm. Jour. Trans., 1893, 41.

Curara.—A South American.—J. Tillie has examined an arrow poison used by Indians in New Grenada (Colombia), and portions of the plants from which it is said to be prepared. The curara is described as almost black in color, brittle, dissolves in water and has a slightly acid reaction. Though in all probability derived from one or more species of Strychnos, resembles in action the Strophanthus type of the African arrow poisons.

A few particles of it added to a drop of cold strong H_2SO_4 produced a dark-red color changing to a muddy brown. When heated to 110° F., a tinge of green appeared on the edge of the brownish-red drop, and within 40 minutes a very faint olive color was seen.—Pharm. Jour. Trans., 1893, 344; from Jour. Anat. and Phys., xxvii., 402; xxviii., 96.

Woorara.—H. A. Hanbold cites a case of woorara that was 20 years old which was still efficacious.—Alumni Jour., 1894, 30.

Malayan Arrow Poisons.—R. Stockman has examined the physiological action of alcoholic and watery extracts, made from the bark and wood of the root of the trees from which the poisons "ipoh-aker," "aker-lampong," and "prual," are derived.—Pharm. Jour. Trans., 1894, 561.

——— W. T. Dyer calls the attention of R. Stockman to the paper on these poisons by Mr. Leonard Wray, which is published in the Kew Bulletin for 1891.—Ibid., 582.

——— E. M. Holmes directs the attention of W. T. Dyer that the plants yielding these poisons are not accurately identified, and even that the exact species yielding the poisons are not known.—Ibid., 747.

Arrow Poisons Due to Bacteria.—See Bacteriology.

Mururé is the name given by the natives to a Brazilian tree, the botanical source of which is unknown. The bark presents a brick-red color, with darker patches on the outer surface; internally it is fibrous, grayish and rather hard. Upon incision a reddish, syrupy liquid exudes, which is of acid reaction, 1.100 density, and is called vegetable mercury. The physiological experiments show it to be poisonous, injections of the neutralized juice having caused death in various animals. The authors have detected the presence of an alkaloid, besides other principles.—H. Cathelineau and C. Rebourgeon; L'Union Pharm., 1893, 333; Amer. Jour. Pharm., 1893, 454.

NATURAL ORDERS.

AMARYLLIDACEÆ.

Narcissus Orientalis.—L. Robechek obtained two-tenths per cent. of glucoside, colored reddish-brown by sulphuric acid and yellow by nitric acid, and two one-hundredths per cent. of an alkaloid in colorless acicular crystals. These crystals, when heated on platinum foil, melted to a bright red liquid and then were completely volatilized. Gave off odor of ammonia on heating with soda-lime. Conc. sulphuric acid colored the crystals dark brown.—Amer. Jour. Pharm., 1893, 369.

APOCYNACEÆ.

Acockanthera.—Description of arrow poisons. See under Poisonous Plants.

Apocynum Cannabinum.—Mossa reports cases showing its diuretic value.—Allg. Homeopat. Zeit., Nos. 1 to 2, 1894.

Oleander as a Cardiac Tonic.—Oefele reports (Rev. Int. Bibl. Med.) that the dried flowers of Nerium oleander, in 3 grain doses, or 10 to 20 drops of a 10 per cent. tincture, two or three times a day, exert a powerful influence on the heart, similar to digitalis. Its diuretic action is very marked, and stimulates the peristaltic action of the intestines.—Pharm. Centralh., 1893, 342.

AQUIFOLIACEÆ.

Maté.—Hermann Kunz-Krause has summarized the literature of maté (Ilex paraguayensis), and examined the drug with the view of ascertaining whether ilixanthin (of Ilex aquifolium) or choline were present. He has determined the presence of choline and the absence of ilixanthin, and that the tannin of the maté is identical with caffeo-tannic acids yielding the same decomposition products, viz., sugar and dioxycinnamic acid (caffeic acid).—Arch. der Pharm., 1893, 613.

ARALIACEÆ.

Ginseng—American.—Seeds of ginseng have been received at the Royal Gardens, Kew, for experimental purposes of cultivation.—Pharm. Jour. Trans., 1893, 81; from Kew Bull., 76–77; 71.

Ginseng—Adulteration of.—The ginseng when green is soft and porous, but when dry is of close texture. While in its green state the swindler, or seng loader, inserted a wire into the root, making an opening below the end in one of the many folds of the root. The wire, a good sized one if the root was large, could be pushed through the root until its point reached near the end. The cavity thus made was filled with hot lead, poured into the hole, and the lips of the opening were drawn over. In the process of drying the lips of the wound closed so tightly that it would take an expert to find it among the many natural folds of the root. This is the most unique swindle that was ever perpetrated on root buyers.—West. Drug., 1894, 13; from Oil, Paint and Drug. Rep.

ARISTOLOCHIACEÆ.

Brazilian Aristolochiaceæ.—Peckolt (Pharm. Rund., 1893, 181) describes the following species: (1) *Aristolochia fluoribunda*, whose root is of a strong odor, of a diameter of 2–3 Ctm. and lined with a corky, reddish-brown bark of a pungent, camphor-like taste; the wood itself is very tough and odorless. It is used as a stimulant in amenorrhœa, the powder being given in the doses of 0.3–0.5 Gm. three times a day. The infusion of its leaves is applied on compresses in chronic ophthalmia. (2) The infusion of *A. glasiovii* is used as an infusion internally in typhoid fever, and for baths in rheumatic affections. The root is of a penetrant and aromatic odor, and also serves as a stimulant. (3) The root of *A. macroura* has a saffron-colored fleshy bark; it is of a strongly aromatic odor, and a pungent, bitter taste. It is employed as a diuretic, diaphoretic and emmenagogue. In dyspepsia, the tincture (1 : 4) is given in a dose of 6–8 drops three times daily; in typhoid, the infusion (16 Gm. of root-bark to 500 Gm. of colature) is given in tablespoonful doses every two hours, and the powder in the dose of 0.5 Gm. 10–15 drops are also used for inunction in paralysis. The root and leaves are also aromatic in odor, and are greatly in demand against snake-bite, equal parts of fresh leaves and roots being crushed, mixed with the same quantity of sugar-brandy, and expressed. An infusion of the leaves serves for baths in orchitis, and for washing in chronic wounds. (4) The leaves of the *A. odora* have a strong camphor-like odor, and serve, in an infusion of 30 Gm. to 180 Gm. of colature, as an emmenagogue and for suppressing the lochia. The penetrant, aromatic root is used as stimulant in rheumatism, typhoid fever and uterine affections. Dose in infusion is 30 Gm. in 340 Gm. of colature; the tincture is used (in 8–10 drops) in dyspepsia and pyrosis. 10 kilos of fresh leaves yielded on distillation 14 Gm. of a colorless, weakly alkaline, ethereal oil, of a strong and peculiar odor and burning taste, and of a specific gravity of 0.877. The oil turns black and becomes resinous when treated with sulphuric acid, and turns yellow with hydrochloric and nitric acids. The reaction is very violent with fuming nitric acid; the oil dissolves with a brownish color, and is separated by water as a yellow resin. (5) The thin, reddish-brown root of *A. theriaca* serves as a succedaneum to serpentaria (Virginia snake-root) and is employed as a remedy for snake-bite. (6) The tincture of *A. brasiliensis* is used for inunction in paralytical affections of the extremities. The root of the *A. cymbifera* ("thousand men wort") is greatly in demand as a remedy, and exported in large quantities. Its ethereal oil is yellowish, of a penetrant aromatic and somewhat camphor-like odor and very pungent taste. Its root is a powerful antiseptic, large doses of it causing diarrhœa and vomiting; it is also employed in dropsy, asthma, intermittent fever, etc., in infusion, the dose being 15–30 Gm. in 180–500 Gm. of colature. The author employed the root with favorable effect also against dipsomania (3–4 times daily a tablespoonful of the tincture—containing also $\frac{1}{10}$ per cent. of sulphuric acid—in brandy or wine).

BURSERACEÆ.

Mecca Balsam and Myrrh.—G. Schweinfurth observes that, although the shrub yielding mecca balsam, Commiphora opobalsamum, Engl., is widely distributed over the coast territory of Arabia, the adjacent islands, and southern Nubia, the balsam is collected only in the valleys near Mecca; the plants producing olibanum and myrrh prefer low mountains, 3,000 to 5,000 feet high, and rocky soil. C. opobalsamum averages about fifteen feet in height, possesses a yellow papery exfoliating bark, and produces long, thin, grayish black twigs, from the ends of which a small quantity of balsam exudes. Although not an eye-witness of its collection, Schweinfurth thinks the balsam must be obtained by crushing and boiling the ends of the twigs, or by pouring boiling water over them. Collection by exudation is out of the question, as only a few centimeters toward the ends of the twigs contain much sap, appear varnishy, and yield when incised minute drops of bright green fluid possessing the characteristic odor of Mecca balsam. This is the substance referred to in the Bible under the name of myrrh, an error attributable probably to the similarity of the old Hebrew word "mar" with the late Arabic designation "morr" for the gum resin myrrh. It appears never to have been collected in large quantity; according to information from the principal spice merchant in Cairo, at the present time only a few kilogrammes are annually brought to the market.

Myrrh, according to Schweinfurth, can be yielded only by C. Abyssinica or C. Schimperi, and is probably obtained principally from the former, which is widely distributed, and in certain districts abundant. A. Deflers actually collected myrrh from this plant, which was pointed out to him in the Fadhli district east of Aden as the source of the myrrh brought thence in large quantities into commerce, and a specimen of this myrrh was presented by Schweinfurth to the Pharmaceutical Society of Berlin. The tree is a small one, seldom exceeding 30 feet in height, with a yellow or brown shining papery exfoliating bark. When incised the bark yields abundance of yellowish milky fluid, which solidifies to myrrh. The plant also occurs in northern Abyssinia, but not in such abundance as to offer sufficient inducement to collect the gum-resin; the drug comes probably from the northern districts of Yemen and the mountains of Assir. Balsamodendron myrrha (Hemprichia myrrha, Nees. Schwf.) yields no myrrh; the plant is completely odorless, and yields no trace of resin when branch or stem is incised. Hemprich noted on his specimen that possibly this species yielded myrrh, but the evidence to that effect was insufficient. Nees v. Esenbeck described the plant, however, as the source of Arabian myrrh, hence the error. C. Schimperi grows in Yemen, and produces abundance of gum-resin closely resembling myrrh. It is also found in Abyssinia, where, however, little or no myrrh is collected from it. —See Ber. d. Pharm. Ges., 1893, 237.

CACTACEÆ.

Cereus Grandiflora as a Cardiac.—Gibella (Gazz. degli Ospedali) arrives at the following conclusions: Employed as a tincture, and administered in a dosage from 50 to 200 drops daily, this drug produces no toxic phenomena, and is followed by no evil sequelæ even when employed for a long time. It exercises a happy influence on the circulatory apparatus, explicable by the regulation of the pulse, and favors diastole of the arteries, at the same time diminishing the peripheric resistance of the circulation. The therapeutic effects are not, however, of long duration, lasting usually just so long as the remedy is administered. It can be safely recommended in all organic cardiac affections except grave arythmia, especially where a prompt effect is desired and other cardiacs have failed or have not given satisfactory results. It is equally efficacious in functional cardiac derangements, from whatever cause, and is especially useful in nervous cases. The author states that he has employed the substance in maximal daily doses of 300 drops, divided into two or three portions, to be taken at suitable intervals during the twenty-four hours. It seems to make little or no difference whether the remedy be taken before or after meals, but the author thinks that he has noted more prompt effects when it has been administered to the patient fasting.—Nat. Drug., 1894, 46.

CANNACEÆ.

Cannaceæ of Brazil.—T. Peckolt (Pharm. Rund., 1893, 257) says their rhizomes contain starch but not enough to be useful as food, and a soft resin ; but no ethereal oil. The small bulbous rhizome of the *Canna indica L.*, is feebly aromatic ; its decoction is said to act diuretically. It is given in spasms of the bladder. Its tincture is used as tonic in doses of 8–12 drops. The tincture of the seeds of Bananeirinha domata (small, wild banana) is used as a tonic in the dose of 8–15 drops. The decoction of Canna edulis serves as a diuretic in affections of the bladder. A teaspoonful of its tincture is administered with water four times daily, in catarrh of bladder. The expressed juice of the unripe husks of the Canna latifolia, with the seeds, is applied on cotton in ear-ache. The decoction of its leaves and stems serves as a gargle in angina and as a lotion in rheumatism ; but it is most frequently employed for washing wounds. The decoction of the rhizome (30 Gm. to 400) is administered by the tumblerful as a diaphoretic and diuretic, and is used also as a poultice in herpetic eruptions. The decoction of the leaves of Canna lanuginosa (60 Gm. to 500) is used as a clyster in hæmorrhoidal affections. The pulverized root mixed with cecropia charcoal, is a very popular tooth-powder. The decoction of the leaves of Canna glauca is used as a diuretic, for lotions in rheumatism, and for removing tan, freckles, etc. The fresh crushed leaves of the Canna Warszewiczii are used as an emollient cataplasm. The decoction of the rhizome serves as an injection in vaginal gonorrhœa. The decoction of the rhizome of Canna denudata (30 Gm. to 200), is administered in asthma (a tablespoonful every hour), and as an emmenagogue (a tumblerful three times a day). Syrup, prepared of equal parts of its decoction and of sugar, is given in chronic bronchial catarrh, in tablespoonful doses.

CANNELLACEÆ.

Canella Bark.—H. G. Greenish has examined canella barks from various sources, and finds that the structure of the bark is by no means so uniform as it has hitherto been considered. Notable variations have been demonstrated, and the occurrence of these variations is of importance, inasmuch as it is precisely these barks of more or less abnormal appearance that the histologist is called upon to identify. To ignore such variations is therefore to render the determination uncertain. Of special interest is the possible presence of both schlerenchymatic cells and cells with red resin, for both of these elements have been regarded as especially characteristic of Cinnamodendron corticosum. In determining the identity of barks exhibiting either or both of these characters, caution must therefore be exercised. The paper is well illustrated and should be consulted for detailed information.—Pharm. Jour. Trans., 1894, 793.

CAPPARIDEÆ.

Ferment in Capers.—See ferments.

CAPRIFOLIACEÆ.

Catha Eduli.—The leaves of this plant (which constitutes the Arabian drug. Kât or Khat) have recently been examined by Collins (Jour. Pharm. Chim., xxviii, 337), and his physiological and therapeutical observations are reported to indicate that this drug greatly excites the nervous system, banishes sleep, restores physical strength, and increases muscular activity. The leaves are used throughout Arabia for preparing infusions (5–15 Gm. per litre, or 1–3 : 200) tinctures and extracts.

Cochleariæ armoraciæ—Essential Oil of.—G. Sani. A glucoside contained in Cochlearia armoracia undergoes hydrolysis when the bruised roots, gathered during the autumn or winter, are left for 24 hours in contact with water; the essential oil and a little sulphur are then extracted with ether. On evaporating the ethereal solution, a residue of allylthiocarbimide is obtained; the roots, therefore, contain potassium myronate. —Real Accad. Linc., 1892, 17; Jour. Chem. Soc. (Abs.), 1893, 633.

Sambucus ebulus—Oil of.—Radulescu has recently experimented with Sambucus ebulus. The seeds of this plant, when washed with water, and dried in the air, are of the size of sesamė seeds, and yield, when pressed between the finger, a yellowish oil. The oil is obtained from the crushed seeds, by means of extraction with ether in the Soxhlet apparatus; the yield is 24.85 per cent. At first it is very viscid, turbid, and of a yellowish-green color; it leaves a greenish residue on the filter, and yields a clear filtrate of an olive oil color, somewhat mucilaginous, first tasting like hemp-seed oil, and afterwards like castor oil, and of a peculiar odor. Its specific gravity is 0.9318; its freezing point is between 30° and 40° C.; it possesses Hübl's iodine coëfficient of 83, and yields, with fuming nitric acid, a yellow coloration. The acid liberated by saponification freezes at —8° to —9° C. Oil of Sambucus ebulus is closely related, so far as specific gravity and freezing point are concerned, to the oils of Pinus sylvestris, Dracocephalum medavicum, Lallemantia iberica, and Reseda; the iodine coëfficient is about the same as that of olive and almond oil. The freezing point of the free acid is near that of ricinoleic acid.—Bull. Soc. di Scien., Bukarest, 1893, Nos. 5 and 6.

CHENOPODIACEÆ.

Betaine and Choline in Wormwood.—Jahns (Ber. d. Chem. Ges., 1893, 1493,) has obtained these bases. Betaine occurs in about 0.5 per cent., and choline in nearly 0.1 per cent.

Seeds of Chenopodium album, L.—G. Baumert and K. Halpern have made analyses for determining the chemical composition and nutritive value of the seeds of Chenopodium album. L.—Arch. der Pharm., 1893. 641.

COMPOSITÆ.

Artichoke—Carbohydrates of.—C. Tanret finds that the tubers of artichoke, just before they are fully developed, contain about 160 Gm. of the following carbohydrates per litre of juice: Saccharose, inulin, pseudo-inulin, inulenin, helianthenin and synanthrin.—Compt. rend., cxvii., 50; Pharm. Jour. Trans., 1893, 83.

Alcoholic Fermentation of Jerusalem Artichokes under the Influence of Pure Yeast.—L. Lévy. An extract of Jerusalem artichokes in water containing 0.2 per cent. of potassium hydrogen tartrate was sterilized, and then mixed with pure yeast from Romane Conti, or with a ferment resulting from a cultivation of this yeast on an infusion of barley. Fermentation takes place rapidly at 20–25° C., and is complete in about three days. The chief product is ethyl alcohol of good flavor, together with a comparatively small quantity of aldehyde and a still smaller quantity of higher alcohols. In the quality of the main product and the low proportions of the head and tail products, fermentation with pure yeast has a considerable advantage over the ordinary method.—Compt. Rend., 1893, 1381.

Erigeron canadense—Oil of.—F. W. Meissner's experiments verify the statement that this oil consists chiefly of dextrogyrated limonene. The thought that pinene possibly occurred together with limonene in the oil evidently must be dismissed. The principal constituent of the oil besides limonene appears to be a high boiling substance, probably aldehyde-like in character.—Amer. Jour. Pharm., 1893, 420.

Erigeron canadense.—A modern writer says that the oil of erigeron is efficient in various kinds of hemorrhage, especially when of a passive character. The dried flowering herb is recommended as a good local styptic for bleeding of the skin, especially from cuts after shaving. Flagg gives two drops of a tincture made with absolute alcohol two or three times a day as an antihemorrhagic. One or two drops of the same tincture in half a teaspoonful of water is given for acute hemorrhage every minute or every half hour, or as indicated.—Amer. Drug. and Pharm. Rec., 1894, 93.

Insect Powder.—The yellow flowers possess a more energetic action upon all species of insect life.—Nat. Drug., 1893, 157.

——— Pyrethrum appears to be grown on a commercial scale in this country thus far only in California. The extensive use of pyrethrum powder as an insecticide has excited considerable interest in the culture of the plants used for that purpose, viz.: Pyrethrum cinerariæfolium and P. roseum form the Dalmatian, Persian and Buhach insect powders. The P. cinerariæfolium has found great favor in California, and its culture in Mercer county, as well as in Los Angeles county, has assumed large proportions. The culture of this species, so far as known, has only been carried on on level land with plentiful irrigation; but the fact that nearly all species of pyrethrum are natives of mountains, seemed to indicate that the hot plains would not be the best place. Experiments in the Santa Cruz mountains indicated the success of this species there. While P. roseum is the prettier species, it cannot compete with P. cinerariæfolium in culture for profit. Its yield is not one-third of the latter, notwithstanding its larger heads. It produces but few good heads the second year, and its flowering is so gradual that all the heads are not ready for gathering at one time. Experiments with P. roseum in New York State were fairly satisfactory; the plants failed to bloom the first season, but endured the winter unharmed and gave a profuse crop of blossoms the second season. Trials of powder made from these indicated as much strength as, or more than, that of the California powder.—U. S. Experiment Station Report, 1893.

——— J. R. Hill (Brit. and Col. Drug., 1894, 302), says the following are the three commercial grades met with in the sales at Mincing Lane: (1) The closed flowers. These are the finest quality, and by grinding these the finest and most powerful insect powder is obtained. They are worth, in the wholesale market, about 116s. per cwt. (2) The half-closed flowers. From these a second quality of insect powder is obtained. They are less aromatic than the preceding grade, and less powerfully insecticidal. They are worth about 80s. per cwt. (3) The open flowers. These are the lowest commercial grade, and are worth only about 60s. per cwt. Genuine Dalmatian insect powder should have a greenish-yellow color, a characteristic "tea-like" odor, and a slightly bitter, aromatic taste. It contains from 8 to 10 per cent. of moisture, and yields about 6.5 to 7 per cent. as ash, which is nearly entirely soluble in hydrochloric acid.

Minet—A Disease of Chicory.—Prilleux finds it to be a parasitic fungus. Saccharate of copper spray is suggested as a preventive.—Nat. Drug., 1893, 109.

Pyrethrum tanacetum as a Nervine.—S. Smirnoff (St. Louis M. and S. Journ., 1893; No. 5), calls attention to a nervine—Pyrethrum tanacetum (Tanacetum balsamita, Balsamita vulgaris; Costmary)—held in high repute in Russian popular medicine since many years. It is a plant growing abundantly all over Southern Europe. Its odor is pleasant and strongly aromatic. The author has administered its decoction with good results in three cases of epilepsy. Definite dose-statements are not given, however.

Determination of Falsified Santonica.—1 Gm. of suspected drug is finely pulverized and is then agitated for some time with 10 C.c. of absolute alcohol; the whole is then heated to boiling, filtered, a piece of caustic potash is added to the filtrate, and the whole is again heated. If the drug be pure, the liquid will acquire a pronounced red color; if falsified, the color will be yellow; and if no santonica be present, the liquid will be colored but faintly, if at all.—Astolfi, in Bollet. Chim.-Farm; Pharm. Zeit., 1893, 333.

Tagetes glandulifera—Flowers of.—O. Hesse. Tagetes glandulifera is a plant met with in Argentina, where the flowers are used as a stomachic, aperient, diuretic, and diaphoretic, and are employed in cases of gastritis and indigestion. Their application is, however, said to be attended with danger. The author finds that the flowers do not contain any alkaloid which can be extracted with ether or chloroform. Light petroleum ether, however, extracts a substance which, when crystallized from alcohol, melts at 62° C.; it may be cerylic acetate, as the alcohol obtained on hydrolysis agreed in properties with cerylic alcohol, and the original substance was regenerated by treating the alcohol with acetic anhydride; no analysis or other data are given.—Ann. der Chim., 1893, 87.

Tansy in Epilepsy.—S. A. Siminoff (Med. Obozr., xxxix, 1893, 391), details three cases of epilepsy cured by him by the administration of an infusion of common tansy. He has also used this decoction with good effect in cases of neurasthenia, where valerian had ceased to be effective. A glass of the infusion of the herb (either fresh or dried) is given to the patient at night and in the morning.—Chem. and Drug., 1893, 491.

CONIFERÆ.

Russian Fir Tar.—This tar is obtained chiefly from Pinus syvestris as a syrupy, reddish-brown liquid, of 1.085 sp. gr, containing an amount of acid varying from 2 to 5 per cent. The phenols it contains are guaiacol and its homologues.—Nenki and O. Lieber, in Chem. Zeit., (Rep.) 1894, 81.

Birch and Fir Tar.—Examination by E. Hirschsohn. Birch tar at 20° C. has a sp. gr. of 0.926–0.945 for the better grades and 0.953–0.987 for inferior grades. The aqueous solution, obtained by agitating one part tar with ten parts water, is almost colorless, has an acid reaction, and is colored green with ferric chloride (1 : 1,000); 5 C.c. of the aqueous solution with 2–3 drops aniline and 4–6 drops hydrochloric acid gives a yellow mixture; if the birch tar be adulterated with fir tar or other kinds of tar, a red mixture results. Birch tar with twenty volumes of benzin imparts to the latter only a pale-yellow color; the benzin solution agitated with an aqueous copper acetate solution (1 : 1,000) should not take a greenish color. Fir tar has a specific gravity at 20° C. of 1.02–1.15; the aqueous solution (1 : 10) has a yellowish color, an acid reaction, and with ferric chloride gives a red coloration; 5 C.c. of the aqueous solution with aniline and hydrochloric acid gives a red mixture which when agitated with chloroform, imparts to the latter an intense red color. The benzin solution agitated with aqueous copper acetate causes a green coloration. Fir tar is perfectly soluble in nine volumes of 90 per cent. alcohol; a turbid mixture indicates admixtures with birch tar, kerosene.—Pharm. Ztschr. f. Russl., 1893, No. 42.

Mucilage of Yew.—Mangin observes that the palisade cells of the yew leaf contain mucilage, the presence of which can be demonstrated by macerating small fragments in alcohol strongly acidulated with hydrochloric acid, washing, and transferring to dilute ammonium oxalate. This treatment dissolves the pectate of calcium, of which the author considers the middle lamella to consist, and liberates the cells. The epidermis and fibro-vascular bundles can be removed by straining through a fine platinum wire gauze; the parenchymatous cells which pass through can be stained with naphtalene blue and acid green, the mucilage acquiring a violet color. The part it plays in the palisade cells is not known.—Bull. de la Soc. Bot. de France, xv., 315; Pharm. Jour. Trans., 1894, 896.

CONVOLVULACEÆ.

American Colocynth.—L. E. Sayre describes some colocynth fruits grown from Trieste seed at the canaigre works, Deming, New Mexico, by C. B. Allaire. The plants bore from sixty-five to eighty fruits each, the samples of which measured from thirteen to twenty-four inches in circumference. The American colocynth fruits contained about twice as many

FIG. 40.

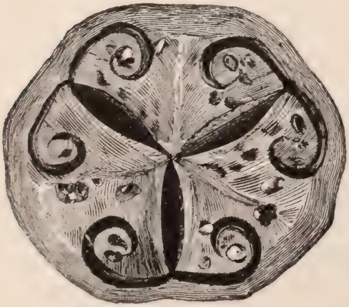
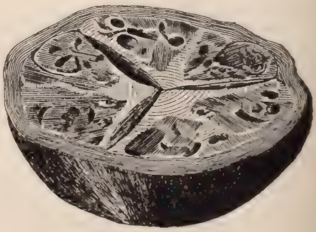


FIG. 41.



seeds as those imported from Trieste, but possessed only about two-thirds the cathartic action of the latter. A fruit weighing 1101 Gm. yielded 394.58 Gm. of pulp free from seeds, but this was reduced on drying to 31.75 Gm. When powdered it was light in color and very bitter, but was much more compact than the product of the Indian fruit. Parallel determinations of the proximate constituents of the imported pulp and the American product yielded the following percentage results:

FIG. 43.

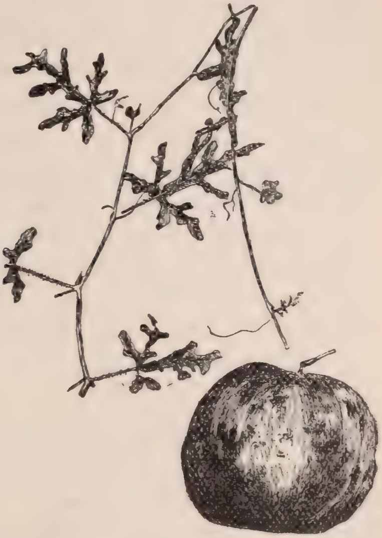
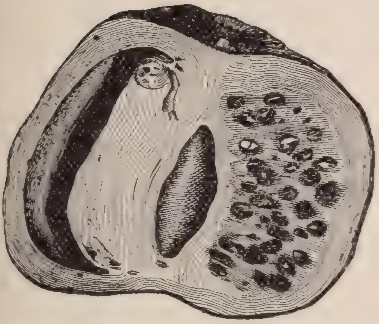


FIG. 42.



American Colocynth.

Figs. 40 and 41. Transverse Sections. Fig. 42. Longitudal Section. Fig. 43. Whole fruit and portion of stem. All reduced.

Constituents.	Imported.	American.
I. Ether-chloroform extract	3.21	4.62
(*a*) Fat	1.11	.521
(*b*) Resin	.64	.48
II. Alcoholic extract of residue from I	16.61	23.23
Reducing sugar.	2.15	10.31
III. Aqueous extract of residue from II	31.07	24.69
Gum	9.36	12.61
IV. Amyloid principles	2.07	2.34
V. Cellulose	13.5	14.76
VI. Albuminous (protein) compounds	14.31	14.69
VII. Ash	9.76	6.01
VIII. Moisture	6.8	7.9
Diluted alcoholic (official U. S. P.) extract	32.68	38.87

The bitter principle, colocynthin, was not isolated on account of insufficiency of material.—Amer. Jour. Pharm., 1894, 273.

Colocynth in Turkey—Colocynth, although in demand in the European markets, was not exported in such considerable quantities in 1893 as during the previous year. It is gathered by the Arabs in the vicinity of Gaza, where it grows wild, but in consequence of the levying of the tithe by the authorities, which has of late been exacted from the exporters, instead of from the Bedouins who collect the article, shipments were somewhat less in 1893 than in 1892.—Consular Report; Pharm. Jour. Trans., 1894, 1050.

Jalap—Spurious.—H. G. Greenish examined a parcel of jalap, and found, upon microscopic examination, the products of three other plants. One contained no secretion cells, and therefore is not a convolvulaceous root. In another the milk cells of jalap were absent. The third more closely resembled male or light jalap of Ipomoea orizabensis, the starch grains, however, being much smaller.—Pharm. Jour. Trans., 1893, 382.

Jalap.—Researches on an "old fashioned Tampico Jalap."—Analyses of two tubers revealed respectively 8 and 5 per cent. of resin.—Chem. and Drug., 1894, 538.

Lactiferous Cells in Convolvulaceæ.—F. Czapek finds that all convolvulaceæ secrete a milky juice. In Dichondra no transverse walls are present, the vessels have thick but never suberised walls. All other convolvulaceæ contain series of cells, the transverse walls of which are not absorbed; the membrane is thin and ultimately suberises. These cells are developed in the embryo, and follow the course of the phloem bundles (K. Akad. d. Wiss. in Wien, through Bot. Centralblatt, lvii, 267).—Pharm. Jour. Trans., 1894, 818.

CRUCIFERÆ.

Active Principle of Iberis coronaria—Schlagdenhauffen and Reeb are at present working on this subject, but since Dupuy has just read a paper on the chemical and therapeutic properties of the cruciferæ, in Paris they have published their results as far as they go (Chem. and Drug., 1893). Dupuy has worked on Iberis amara, whose composition is certainly somewhat closely allied to that of I. coronaria. The authors, however, find that in the first case the oil in the plant contains sulphur and phosphorus, but does not in the second. From both plants a glucoside has been isolated, reported by Dupuy to have a depressing action on the heart, by the authors to paralyze the nervous system more or less. The seeds of Iberis coronaria yield to petroleum ether 25 per cent. of oil completely insoluble in acidulated water. There is no sulphur or phosphorus in it; consequently no lecithine. The seeds, after the removal of the oil, yield 20 per cent. of extractive to alcohol. The taste of this is very bitter, and the alcoholic solution becomes very turbid with water, but becomes clear again on the addition of hydrochloric acid. It contains a glucoside, which is toxic to a marked degree. The latter is isolated by dissolving as much as possible of the extract in water, concentrating the solution, and adding sulphate of sodium, which causes the glucoside to be precipitated. The precipitate is collected on a filter, dissolved in alcohol, the solution is evaporated to dryness, and the residue taken up again with water. The aqueous solution is treated with neutral acetate of lead and filtered ; excess of lead is removed by sulphuretted hydrogen, and the filtrate on evaporation leaves the glucoside as a bitter yellow powder of neutral reaction ; it is precipitated by tannic acid, but not by iodine and potassium iodide. It does not reduce Fehling's solution until it is boiled with weak acid.

CUPULIFERÆ.

Juglans cinerea.—E. D. Truman examined the root bark crop of 1892, in November and December, 1892, and the bark from the branches collected in January, 1893, with the following results :

Solvent used.	Root Bark.	Per cent.	Trunk Bark.	Per cent.
Petroleum ether	Fixed oil	4.94	Fixed oil	5.98
Stronger ether	Fixed oil and colorless-crystalline resin	2.31	Fixed oil and colorless crystalline resin	2.59
Absolute alcohol	Juglandic acid, extractive matter, etc	6.94	Uncrystallizable acid, crystalline resin, etc.	7.42
Distilled water	Dextrin	0.52	Dextrin	0.70
	Mucilage	2.25	Mucilage	0.70
	Glucose	3.05	Glucose	3.34
	Saccharose	1.34	Saccharose	2.06
	Extractive	2.49	Extractive	4.20
Dilute solution of sodium hydrate	Pectin and albumious matter	1.68	Pectin and albuminous matter	1.48
	Coloring matter and extive	6.86	Coloring matter and extractive	2.06
Dilute hydrochloric acid	Pararabin and traces of calcium oxalate	2.62	Pararabin and calcium oxalate	4.08
Chlorine water	Lignin	9.22		6.96
	Cellulose	44.26		43.79
	Moisture	4.60		4.75
	Ash	5.82		5.34
	Loss	1.10		4.55
		100.00		100.00

The fixed oil in each case was brown in color, and saponifiable by alkalies ; the latter turned them of a violet color ; this color was much brighter with the oil from the bark of the root. Aluminum was not found in the ash.—Amer. Jour. Pharm., 1893, 426.

Four Oak Barks from India.—Henry Trimble has examined the following, with the results indicated :

Species	Tannin in air-dry bark.	Moisture.	Tannin in absolutely dry bark.	Ash in absolutely dry bark.
Quercus annulata	11.37	6.85	12.20	11.30
Quercus dilatata	7.40	6.88	7.94	10.02
Quercus incana	22.12	5.31	23.36	11.06
Quercus semicarpifolia	7.99	7.04	8.60	10.88

One per cent. solutions of the tannin from the different species reacted as follows:

REAGENT.	Quercus annulata.	Quercus dilatata.	Quercus incana.	Quercus semicarpifolia.
Boiled with dilute sulphuric acid.	red phlobaphene.	red phlobaphene.	red phlobaphene.	red phlobaphene.
Ferric acetate.............	brownish-green ppt.	brownish-green ppt.	green ppt. and color.	green ppt. and color.
Bromine water............	yellow ppt. turning brown.	yellow ppt. turning brown.	yellow ppt. turning brown and black.	yellow ppt.
Ferric chloride and Ammon. hydrate	dark green ppt. dark purple ppt.	brownish-green ppt. dark purplish-brown ppt.	brownish-green ppt. brown ppt.	green color and ppt. purplish-brown ppt.
Ammonio-ferric sulphate ...	dark green ppt., brownish color.	brownish-green ppt. and color.	bluish-green color, green ppt.	green color and ppt.
Lime water...............	brownish-yellow ppt. darkening.	brownish-yellow ppt. becoming purple	brownish-yellow ppt. darkening.	yellowish ppt. turning pink.
Nitrous acid..............	brown ppt.	brown ppt.	brownish-black ppt.	brownish-yellow ppt.
Sodium sulphate	reddish-brown ppt.	purplish-brown ppt.	brownish-purple ppt.	yellow color.
Stannous chloride and hydrochloric acid	slight reddening of color.	slight reddening of color.	slight reddening of color.	pink color.
Pine wood and hydrochloric acid.	violet color.	violet color.	violet color.	violet color.
Potassium dichromate......	heavy brown ppt.	heavy brown ppt.	heavy brown ppt.	heavy brown ppt.

The similarity in behavior toward reagents indicated the tannins from these four barks to be identical with one another, and with that from several species of oaks indigenous to this country, recently investigated by the author. The ultimate analysis of the tannin from one of the above samples confirms the opinion that in them we have a tannin identical with that from our own species. Two of the samples exceed in tanning capacity the bark from any of the American oaks, while the other two are equal to the average of our own.—Amer. Jour. Pharm., 1894, 299.

Chestnut Tannin.—The export of a tanning extract from the bark of chestnut trees is increasing.—From Consular Rep. of Cherbourg for 1892; Pharm. Jour. Trans., 1893, 261.

Oak Wood and Bark.—W. B. Thompson comments on the deterioration of the wood of the oak, and asks if the bark too has not become inferior. This deterioration he assumes to be due to the present unnatural germination of the seed.—Amer. Jour. Pharm., 1894, 293.

DROSERACEÆ.

Drosera whittakeri—Coloring Matters of.—E. H. Rennie has continued his investigations, and finds that these substances are hydroxy-derivatives of methylnaphthaquinone.—Jour. Chem. Soc., 1893, 1083.

EUPHORBIACEÆ.

Cascarilla—Bark of a New Species of.—A. W. Southall describes a bark which is believed by E. M. Holmes to belong to the genus Cascarilla and is obtained from the U. S. of Colombia. The bark has a persistently bitter taste, and occurs in pieces from half to one foot long and about half an inch thick. The external portion is covered by a dark brown to light grey cork layer, and is slightly wrinkled longitudinally with occasional transverse cracks. The fracture is splintery and slightly fibrous, showing a slight yellow interior. The internal surface is a rather darker yellow, and shows a number of fine longitudinal furrows. The bark was examined histologically by C. E. Robinson, who found that the transverse section showed a number of layers of cork six or more cells deep, inside which are a large number of stone cells tangentially elongated, and beyond these, bast fibres not so much thickened as those found in cinchona, but like them in the fact that they are short, as seen in the radial section. A detailed chemical examination of the bark showed that it contained 9.5 per cent. of moisture, and yielded 3.7 per cent. of ash, which contained potassium, sodium, calcium and manganese. These metals appear to be present in the bark in combination with malic and oxalic acids. Caoutchouc, saccharine matter, and a little tannin were also present, as well as an acid resin, soluble in alcohol or ether, and melting at 221° C. This resin appears to represent the active principle of the bark, and to it the whole of the bitterness is due. When it was fused with caustic potash and afterwards treated with hydrochloric acid and ether, valerianic acid and phloroglucinol were separated in the ethereal solution. No alkaloids or glucosides were found.—Pharm. Jour. Trans., 1894, 574.

Castor Bean in India.—Cultivation and method of extracting the oil.—U. S. Cons. Rep.; Pharm. Jour. Trans., 1893, 426.

Germination of the Castor-Oil Seed.—L. du Sablon has studied the chemical changes which occur during the germination of the castor-oil seed, and publishes a tabular statement according to which it appears that, whereas the proportion of oil in the dried material of the seed-albumen and embryo as found in the resting seed was 69 per cent., it gradually decreased as germination proceeded, until, when the radicle was 12 Cm. long, the albumen contained but 11 per cent. and the embryo 7 per cent. of oil. Fatty acids are also present during germination, the proportion increasing, although somewhat irregularly, until it exceeds 0.5 per cent. at the end of the process. The presence of glycerin could not be ascertained with certainty. Glucose or reducing sugar, though not constituting more than 0.4 per cent. of the seed normally, notably increases in amount as germination proceeds. As much as 14 per cent. was found in the dried material of the seed-albumen, when the radicle had attained a length of 10 Cm., and in the albumen and embryo, considered together, the proportion of sugar equaled nearly 20 per cent. It is suggested that these facts seem to indicate that the sugar is probably produced by direct transformation of the oil in the seeds.—Comp. rend., cxvii., 524.

Euphorbia calyculata.—A plant indigenous to Mexico, is described by J. V. Gordon (Rev. Med.-Quir.; 11, No. 1) as a tree of the height of 5–6 metres. Its trunk is bulky; its periderm constantly exfoliated. The leaves are 15–16 Cm. long, and 4–5 Cm. broad in their largest part; they are alternate, lanceolate, and pointed, with revolute margins. The flowers appear in March, before the leaves; they are hermaphrodite, small, and of a whitish-green color. The calyx is bell-shaped. The filaments of the stamens are provided with an articulation dividing them into unequal parts. The anthers are bilocular. The ovary is trilocular, and hexagonal. The seeds are 9–10 Mm. long, and ⅞ inch broad, without protuberances; their surface is hard and even, of a dark-gray color. Their albumen is fleshy and oleaginous; the cotyledons are plain and small. The entire plant contains a white, milky juice in abundance. A transverse section of the seed, examined microscopically, shows that the kernel, containing the active principle, has a very simple anatomical structure. Its tissue consists principally of a parenchyma, formed of round cells filled with tiny oily drops. The embryo is separated from the albumen by a very delicate membrane, and composed of tiny cells regularly collocated in rows. When treated with ether or pressure, the seed yields 30 per cent. of oil, of an amber-yellow color, nearly odorless when fresh, with a taste at first imperceptible but becoming soon slightly acid, and of a density similar to that of almond oil; it is partly soluble in alcohol, very much so in ether, chloroform, benzene and carbon bisulphide. Two drops of this oil suffice, it is said, to cause in an adult a drastic-purgative action, without the colic and other disturbances occasioned by the oil of croton. When applied externally, it acts as a revulsive. In time, this oil loses its therapeutic properties, like all oils of the genus Euphorbia. The author proposes to call this oil "Mexican Croton Oil."

Hippomane Mancenilla.—Gazeau and Reboul have investigated the poisonous properties of this tree.—Nouv. Rem., 1893, 414; Pharm. Post., 1894, 76.

Kamala—Constituents of.—A. G. Perkin. When extracted with ether, kamala yields a dark, brownish resinous product, from which six distinct substances can be isolated. Five of these, viz., rottlerin, isorottlerin, a wax and two resins, one of high and the other of low melting point, form the principal constituents. There is also present a trace of a yellow crystalline coloring matter, melting at 192-193° C. Rottlerin was never obtained yellow, as described by Anderson, and it is probable that Anderson's preparation was contaminated with this yellow crystalline principle. When heated with acetic anhydride, rottlerin yields a diacetyl derivative of the formula $C_{11}H_8O_3(C_2H_3O)_2$. The molecular weight of rottlerin has not been satisfactorily determined, but from preliminary experiments it is evidently high, probably about 485.

The wax gave on analysis numbers which are widely different from those obtained by Anderson, and it is therefore possible that the nature of the wax may differ in samples of kamala procured from different localities. Isorottlerin crystallizes in groups of minute plates, M. P., 198–199° C. In appearance it resembles rottlerin but is distinguished by its insolubility in CS_2, chloroform and benzene.

Kamala contains a small quantity of a sugar soluble in water.—Pharm. Jour. Trans., 1893, 159, 236.

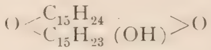
Kamala and Rottlerin.—P. Bartolotti (Gazetta 24, 1–7,) confirms the formula $C_{11}H_{10}O_3$, previously assigned to rottlerin, but has evidently overlooked the paper published some months previously to his own, by A. G. Perkin (Pharm. Jour. Trans., 1893, 975). The author finds that rottlerin melts at 200–201° C., whilst Perkin gives the melting point at 191–191.5°. The so-called "kamaline" put into the market by Merck, of Darmstadt, is simply rottlerin.

Dibenzoylrottlerin $C_{11}H_8Bz_2O_3$ and rottlerin hydrazone $C_{11}H_{10}O_2N_2HPh$ are yellow powders, which decompose on heating, and are soluble in the ordinary solvents. The ash of kamala contains a considerable proportion of manganese.

Mercurialis annua, L.—G. de Letter, of Brussels, considers that this plant, properly collected, dried and preserved, constitutes an economical laxative. Twenty to thirty Gm. of the dried herb, in aqueous infusion, is suggested as the proper dose, or ten to twenty Cgm. of an alcoholic extract. A medical authority is also quoted, to the effect that a decoction of the fresh herb possesses both laxative and diuretic properties.—Pharm. Jour. Trans., 1894, 734; from Journ. de Pharm. d'Anvers, 1894, 30.

Leaves of Vaccinium myrtillus.—They have attained some notoriety as a remedy for diabetes, it having been found by polariscopic examination that the administration of pills containing an extract of the leaves caused a decrease in the amount of sugar in the urine. Von Oefele explains this observation as follows: the leaves contain arbutin, which has for a long time been known to cause the urine to become lævogyre, and, therefore, the dextrogyre rotation of diabetic urine is decreased or even replaced by a lævogyre rotation. The fermentation test for sugar is also deceptive, since the leaf constituents are known to restrict or even prevent fermentation of sugar, and it is merely a question as to the quantity of the extract taken to entirely prevent activity in the yeast. It is interesting to note that the advocates of this remedy disregarded entirely the results obtainable with Fehling's solution, claiming that the strongly reducing effect of the urine was due to some constituents in the extract, and that the two tests, the actions of which were explained above, were only to be relied upon; V. Oefele, however, states that Fehling's test reveals the true condition of the patient.—Pharm. Centralh., 1893, 306; See, also, Pharm. Zeit., 1893, 355.

Urson.—In the leaves of the Arctostaphylos uva-ursi, Trommsdorf discovered this body, of which Gintl gives the following account: Urson, when in the pure state, melts at 265° C. (Hlasiwetz gives 198° to 200°); from an analysis, and molecular weight determination, it appears to possess the formula $C_{30}H_{48}O_3$. Through the formation of a monoacetyl and a monobenzoyl derivative, it appears to contain one hydroxyl group. When reduced energetically with hydriodic acid and phosphorus, or by distillation with zinc dust, it gives a hydrocarbon of the composition $C_{15}H_{24}$, which is probably a sesquiterpene. From the various reactions which have been studied, it appears to have the constitution



$$O < \begin{matrix} C_{15}H_{24} \\ C_{15}H_{23}\,(OH) \end{matrix} > O$$

—Pharm. Post, 1893, 369; Monats. f. Chem., xiv., 255.

Poisonous Constituents of Two Euphorbiaceæ.—Inaug. Dissert. Univ. Dorpat. By Aug. Siegel.

FUNGI.

Ergot.—C. C. Keller claims that pikrosklerotin, cornutin, and Tanret's ergotinin are identical, and that ergot contains but one alkaloid which persists for one year unaltered in ergot. It is crystalline, insoluble in water, soluble in alcohol and chloroform, slightly soluble in ether. With H_2SO_4 the alkaloid is colored violet-blue.—Schweiz-Wochenschr. Chem. Pharm., 1894, 121; Chem. Zeit. (Rep.), 1894, 105.

Preservation of Ergot.—Zanon preserves ergot in jars in which there are alternate layers of perfectly dry sand and ergot. A layer of dry sand is put into the bottom of the jar, and a layer of ergot on it, and so on. The jar is kept closely sealed.—Nat. Drug., 1893, 139.

Chemistry of Fungi.—C. Wermer has cultivated fungi, more especially Aspergillus niger, upon solution of peptone containing the necessary mineral constituents for growth, and finds that ammonium oxalate results from the decomposition of the peptone that takes place. Ammonia is probably first formed, and combines with the subsequently formed oxalic acid. More than half of the nitrogen in the peptone is said to become combined as ammonium oxalate, but the production of this salt is diminished in the presence of sugar. Fungi that are incapable of neutralizing the ammonia formed, by means of oxalic acid, are incapable of existing on a peptone solution, and this acid, it is noted, is not produced if hydrochloric or phosphoric acid be present in the solution.—Ann. agron ; Jour. Pharm. Chim., 1894, 476.

New Naturally-Occurring Nitrogenous Organic Acid.—F. Klingemann. Stahlschmidt obtained an acid $(C_9H_7O_2)_n$, which he named polyporic acid, from a certain fungus occurring on diseased oaks. This fungus was perhaps Polyporus igniarus, and it seems probable that the acid was not a normal constituent but a pathogenic one. The author finds that Polyporus igniarus contains an acid which differs from polyporic acid, but may, perhaps, under certain conditions, be convertible into it. The new acid dissolves in alkalies with a deep brown color, and on analysis gives values agreeing best with the formula $C_{36}H_{39}N_3O_{16}$.—Ann. der Chem., 1893, 89 ; Jour. Chem. Soc. (Abs.), 1893, 602.

A Carbohydrate from Boletus Edulis.—E. Winterstein (Ber. d. Chem. Ges., xxvi., 3098) has found a carbohydrate in boletus edulis, beside trehalose. He proposes to call it "paradextrin."

Trehalose of Mushrooms, with Reference to a Paper by Winterstein.—Em. Bourquelot. Winterstein declared that during the desiccation of mushrooms, or even on keeping the recent heads, the trehalose, if present, totally disappears. Bourquelot shows in reply that three species retain trehalose after desiccation.—Bull. Soc. Chim. de Paris, xi.–xii., No. 8.

Preparation of Kefir.—According to Von Oefele (Aertzl. Rundsch., 1893, No. 47), kefir fungi are not necessary, ordinary yeast being sufficient ; it matters not which kind, provided that the alcoholic fermentation proceeds undisturbed and that the milk does not undergo caseation with its use. However, the author prefers fresh compressed yeast, 5 Gm. of which suffice for a litre [say 1 quart] of milk. It is best to prepare yeast enough for several days at once, by crushing it in a cup and triturating it with ½ per cent. sugar water, setting it aside for twenty-four hours at a moderate temperature, and then carefully decanting the supernatant water.

As much yeast is now taken out as is just needed, and a new supply of sugar water poured to the remaining yeast for another day. The required quantity of yeast is triturated in a cup with 10 Gm. of sugar and half a cupful of milk; the purer the sugar, the finer will be the taste of the kefir. The cup of yeast and milk is then exposed to a temperature of 40° C. for two hours. It will then be covered with foam; bubbles of gas will appear, as if from fresh carbonated water. If this should not be observed, the yeast is unfit for the purpose. The foaming yeast-culture is then admixed, by gentle stirring, with 1 litre of fresh unboiled milk in which 10 Gm. more of sugar have been dissolved. The milk is then filled into the bottles to two-thirds full, securely corked, and kept in a cool place. The corks must be new, good and steeped. This kefir will be ready for use in 48 hours, but becomes stronger, if allowed to mature for a few days more. The process of fermentation may be accelerated by storing in a warmer locality, or retarded by keeping in an ice-cellar. The bottles should be opened with care. The taste of this beverage is said to be pleasant and more agreeable to the patients than that of unfermented cow's milk.

Lycoperdon giganteum (*Puff-ball*).—Credited by A. L. Hall (Med. Rec., 1893; No. 1186) with marked hæmostatic properties. A case of nasal hemorrhage is reported, occurring at the end of the third week of typhoid fever. The nares were packed with loose pieces of puff-ball, and plugs of cotton saturated with iron persulphate solution were inserted into the nostrils, when all signs of hemorrhage at once ceased definitively. The cotton was removed on the next day, and the nares were freed at the end of the third day. In another case of profuse and alarming hemorrhage from the nares, the latter were cleansed with hot water and packed with puff-ball; the result was that the bleeding was promptly checked. He thinks that puff-ball is to be preferred to many other hæmostatics on account of its non-irritating property.

Effect of Moulds upon Medicaments.—A paper calling attention of pharmacists to precautions in the conservation of medicaments prone to develop moulds.—Nat. Drug., 1893, 63.

Myxobacteriaceæ.—R. Thoxter proposes this name for a new group of schizomycetes, somewhat resembling the myxomycetes. The organisms are found in gelatinous growths on decaying wood, fungi, etc., and are motile, rod-like organs, multiplying by fission. They secrete a gelatinous base, and form pseudoplasmode-like aggregations before passing into a cyst-producing state, in which the rods may become encysted in groups or may be converted into spore masses.—Bot. Gazette, through Bact. World, ii., 180.

Mildew or Rust.—Cause of.—From a report to the Board of Agriculture, 1892.—Pharm. Jour. Trans., 1893, 64, 105.

Yeast.—Structure of.—P. A. Dangeard claims to have proven that the

Saccharomyces cerevisiæ possesses a well-characterized nucleus. This material was fixed with absolute alcohol and stained with hæmatoxylin, and the details were rendered evident by the aid of a Zeiss apochromatic objective of 2 Mm. focus.—Compt. rend., cxvii., 68; Pharm. Jour. Trans., 1893, 83; also, Ibid., 362.

Composition and Analysis of Yeast.—P. Ginchard. As regards the ultimate analysis of yeast, authorities are not unanimous. Thus the carbon is made to vary from 34.6 (Liebig) to 52.5 (Wagner), the nitrogen from 7.41 to 15.0; the hydrogen from 6.2 to 7.3, and the oxygen and sulphur, taken together, from 27.1 to 36.4. For the assay of yeast (its fermentative power) the author quotes the processes of Hayduck, Heissl, Mercier, and Billet.—Bull. Soc. Chim. de Paris, xi.–xii., No. 5.

Carbohydrates of Yeast.—E. Salkowski. A gum was obtained from German yeast, as free as possible from starch, by heating 500 Gm. of the yeast with 5 litres of 3 per cent. potash, boiling for half an hour, siphoning off the liquid after a time, and heating it with 750 C.c. of Fehling's solution on the water bath.—Ber. d. Chem. Ges., 1893, 497.

Alcoholic Extract of Beer-Yeast—Chemical Properties of.—It has been shown by Spallanzani that tissues recently detached from the living organism consume oxygen and produce carbonic acid, whether in the air or in an inert gas. Gantier has generalized these facts. J. de Rey-Pailhade (Compt. rend., cxviii., No. 4) has shown that the tissues if ground up with sulphur evolve hydrogen sulphide, and that the proximate principles themselves produce these phenomena if extracted with suitable solvents, and that these effects appear independent of any figured ferment.

Effects of Fluorides on Yeast.—J. Effront states that the use of certain fluorides in distilleries is rapidly extending generally, and he gives the results of some experiments conducted to ascertain the action of these compounds upon the alcoholic ferment, sterilized malt extracts and pure yeasts being employed for the purpose. It was found that on cultivating yeast in a wort containing 200 to 300 mgs. of ammonium fluoride, its power of increasing by cell-multiplication was sensibly weakened, the results varying according to the kind of yeast. After the yeasts had been thus accustomed to the presence of fluorides, however, a wort containing the above quantity of the salt served as a suitable culture medium for any kind of beer yeast. Again, by treating yeasts with gradually increasing quantities of fluorides, they acquired a fermenting power ten-fold in excess of what they normally possessed.—Compt. rend., 1893, 559.

——— E. Sorell describes some of the experiments performed by himself in the same direction as those of Effront. He finds that yeasts accustomed to live in a medium rich in hydrofluoric acid form new cells very slowly, but that when they are removed to a weaker medium their activity becomes very great, new cells forming at such a rate that it is impossible to count them. The activity seems to increase in proportion as the original medium was charged with aseptic matter. Further experiments proved that repeated treatment with increasing proportions of hydrofluoric acid failed to destroy the power of reproduction of the yeast cells.—Ibid., 1894, 253.

Commercial Samples of Yeast.—Examination by M. Maljean, the results of which are shown by the following table :

Number of Samples.	Water.	Ash.	Phosphoric Acid.	Starch.	Sodium chloride.	Per cent. of acidity of fresh yeast.	Remarks.
1	60.75	4.75	1.10	12	trace.	0.40	These yeasts of nine different manufacturers produced bread whose weight varied from 250 to 350 Gm. The acidity was determined with fresh yeast in presence of alcohol (Balland's process).
2	64.65	5.70	1.30	8	——	0.38	
3	59.	3.80	0.85	8	——	0.38	
4	58.25	3.80	0.90	8	——	0.50	
5 { Pure yeast }	73.25	7.75	1.85	0	——	0.69	
6	72.25	7.50	1.90	0	——	0.74	
7	62.	5.40	1.30	9	——	0.42	
8	61.70	5.40	1.29	9	——	0.41	
9	60.80	5.50	1.30	10	——	0.39	

After drying, pure yeast has an agreeable odor, recalling that of hot bread ; they form thin scales, adhering to the vessel in which they were placed, and acquire a slightly dark brown color. Yeasts mixed with starch have, upon drying, a strong disagreeable odor ; they form small masses more or less agglomerated and spotted with white, which is in proportion to the starchy matter they contain.—Jour. Pharm. Chim., 1893, 353.

Study of Yeast.—P. Hantefeuille and A. Perry classify the ferments of the Burgundy vineyards into three groups. The first class are apiculated, and the three groups comprise the ellipsoidal.—Compt. rend., cxviii, No. 11.

GERANIACEÆ.

Geranium Maculatum.—E. H. Stolz has made a microscopical study and a chemical analysis. The author obtained 18.39 per cent. tannin in dry root. He proposes the following formula for making the fluid extract. (Registered Pharm., Oct. 1893, p. 253) : Geranium in No. 40 powder, 100 Gm. ; glycerin, 10 C.c. ; alcohol, q. s. to make 100 C.c. fluid extract. Moisten the powdered drug with 20 C.c. alcohol, and allow to macerate for twelve hours. Pack in a cylindrical percolator and add alcohol until percolation commences, then close lower end of percolator, and allow to macerate for forty-eight hours. Then allow percolation to proceed ; reserve the first 75 C.c. of the percolate, and after adding glycerin to the other portion, evaporate to almost pilular consistence, and add this to the reserved portion, and lastly, enough alcohol to make 100 C.c. of the finished fluid extract.

GRAMINEÆ.

Brazilian Gramineæ.—T. Peckolt (Pharm. Rund., 1894, 109), mentions the following species of gramineæ growing in Brazil and employed therapeutically:

(1) *Imperata Brasiliensis.* The stalks of this shrub attain a height of 30–80 Cm.; its leaves are linear-lanceolate and pointed. Its small seed is smooth and starchy. The rhizome has very long roots, which are not only a very popular remedy, but are also official and often prescribed by physicians. Their action is solvent, aperient and diuretic; 300–500 Gm. of water are boiled down to one-half with 30 (?) Gm. of the root, and a small tumblerful of the decoction is given hourly—especially in bilious fever, icterus and yellow fever (in the last case in combination with infusion of jaborandi).

(2) *Imperata caudata.* This plant is larger than the previous one, its stalks being 1⅓ metres. Its roots are employed medicinally for their vigorous action in beriberi.

(3) *Elionurus candidus.* Its stalks are 50–70 Cm. It is used in vesical catarrh and gonorrhœa, 30 Gm. of the ears to 500 Gm. of colature, 3 times daily a tumblerful; and in chronic bronchial catarrh (infusion of 30 Gm. to 150 of colature, with 150 of sugar, hourly a tablespoonful).

(4) *Elionurus rostratus.* Its stalks are ramified and up to 70 Cm. high; its ears are thick, stiff, shingled and hairy. Its odor is jasmine-like, but its taste is pungent. Its infusion serves as an excitant; and macerated with alcohol or wine, it is used as an aphrodisiac. It is also employed for baths, in rheumatic and paralytic affections.

(5) *Andropogon densiflorus.* Its leaves are 40–60 Cm. long, linear-lanceolate, of a strong, agreeable odor, when fresh—like a mixture of lemon and melissa—but odorless when dried. It serves as a sudorific and antispasmodic tea, and for baths in rheumatism. The root is odorless, of faintly bitter taste. Its infusion—30 Gm.: 300 Gm. of colature; hourly, a small tumblerful—is employed in intermittent fever.

(6) *Andropogon ceriferus.* Its dark-green leaves are 50 Cm. long and 7 Mm. broad; a tea of 30 Gm to 300 Gm. of colature, serves against flatulence and is a diaphoretic. Its rhizome is of a faintly bitter taste, and is used as a diuretic, in the form of a decoction of 60 Gm. in a litre of water, boiled down to one-half—hourly, a tumblerful.

(7) *Andropogon squarrosus* is of a strong, aromatic odor, taste slightly bitter, pungent and spicy. An infusion of 4 Gm. in 120 Gm. of colature is official in Brazil—hourly a tablespoonful, as a stimulant, carminative and diaphoretic. In hysteria and migraine, the tincture (1 : 5) is used in doses of 20–40 drops, 3 times a day, also for inunction in neuralgic pains and paralysis. In colic, 2–3 drops of the ethereal oil are taken with sugar.

(8) The odorless, bitter-tasting roots of *Andropogon spathiflorus* and *A. minarum* serve as diuretics.

(9) *Melinis minutiflora.* Its stalks are ½–1 meter long, and creeping, and raise themselves slightly, only at the blossoming period. The lanceolate, linear, velvety haired, glutinous leaves have a faintly aromatic, honey-like odor. It is a popular remedy in diarrhœa—an infusion of the plant with the root being used (60 Gm. to 500 Gm. of colature), 3–4 cups daily. The alcoholic extract, in doses of 10 Cgm. 4 times a day, is official; also the fluid extract of the fresh plant, the dose being a teaspoonful every 3 hours. The grass contains a brown, odorless resin of a faintly peppery taste, also gallic acid and a tannin stained dark-green by iron salts.

(10) *Panicum scandens.* Its leaves, when coming into contact with the skin, cause an urticarial eruption. Its decoction serves as a lotion in eczema.

(11) *Panicum echinolæna.* Its stalk is 30–55 Cm. high, and has narrow, lanceolate leaves, with sharp margins. The fresh, crushed plant is considered as an excellent emollient, applied either as a cataplasm, when boiled with mandioca meal; as an ointment, when boiled with fat or oil; or in decoction, for baths in orchitis.

(12) *Panicum petrosum.* The fine stalk is furrowed lengthwise, and a meter long; its leaves are narrow, lanceolate and smooth, or more or less hairy. The fresh, bruised plant is used with timbo-root meal (Longocarpus peckolti) as a cataplasm in hepatic swelling, and the root as a resolvent and diuretic—a decoction of 30 Gm. to 250 Gm. of colature being the form of administration, in doses of a tumblerful every 1–2 hours.

(13) *Aristida pallens.* The fresh, contused plant serves as a cataplasm in liver affections. A decoction of the rhizoma—30 Gm. to 500 Gm. of colature—in doses of a tumblerful every 2 hours, is used in bilious fever and liver affections.

(14) *Chloris distichophylla.* Its small seeds are highly esteemed as a diuretic; the decoction of 30 Gm. to 150 Gm. of colature being the form employed.

(15) *Eleusine indica.* A tea from the fresh young plant is a popular remedy against hæmoptysis and hæmopturesis; and a decoction of the root is used in diarrhœa.

(16) *Pappophorum mucronulatum.* Its stalk, ½ meter high, has narrow-linear leaves which are rough above and smooth underneath. A decoction of the bitter-tasting leaves (30 Gm. to 120 Gm. of colature) is taken by the tablespoonful in colic.

(17) *Eragrostis rupescens.* It is popularly called "dew grass." Its reddish stalks reach a height of 36–50 Cm.; its leaves are linear and pointed, with a hairy and broad sheath. The moisture collecting in these sheaths during night is carefully removed and employed by the people for curing goitre.

(18) *Guadua trinii.* Its hollow stalks are high and knotty, and of a whitish-green color. The sheathed leaves are linear-lanceolate, very rough

on both sides, and marked below with more or less short-haired spots. The decoction of the rhizome is popularly employed as a beverage in dropsy, and, externally, as a lotion in herpetic skin affections.

Maize as a Sugar-Producer.—F. L. Stewart gives an account of the results of an investigation concerning the value of Indian corn as a sugar producing plant under new conditions of growth and development. It has been found that from the time sugar first shows itself in the cell sap, during the early growth of maize, until the grain begins to harden, it steadily increases in quantity. Then it suddenly diminishes, and finally disappears. If, however, the ear of corn be removed promptly, at the critical period, all the energies of the plant become directed to the work of storing up more complex reserve materials in the cells of the stalk, the principal function of which thus becomes the accumulation of sugar. Since it is claimed that the immature grain, cured by the ensilage system, constitutes the best, most nutritive, and most readily preserved form in which it can be utilized for stock feeding, it follows that two valuable crops may be secured from the same plants instead of one only. As regards the sugar yield, it is shown that by adopting the method described, the normal 7 to 8 per cent. of sucrose in the juice, at the period when it is richest, is increased to 13 to 16 per cent., *i. e.*, more than is found in good average samples of either East India or Louisiana sugar cane.—Science, xxii., 143.

γ-Dzi or Bobo.—These seeds closely resemble those of Coix gigantea, Roxb. When stripped of their husks they are used as a food, being either parched, made into a beverage or soup. They are used by travelers to purify unwholesome water, and are said to have a beneficial effect in liver disease, to purify the blood, invigorate the stomach, and act as a diuretic. When grown in miasmatic regions, the plant, is described as exerting a beneficial effect similar to that of eucalyptus trees. The results of chemical analysis indicate nothing peculiar beyond a slight increase in the amount of oil or fat present over that found in the great majority of cereals, and the plant is probably a form of the Indian Coix gigantea, which produces a grain that resembles pearl barley, and has long been known to yield "an excellent diet drink for hospital patients in China."—Pharm. Jour. Trans., 1893, 81 ; from Kew Bull., 76–77 ; 76.

GRANATACEÆ.

Punica Granatum—Tannin of.—John Culley. The ground bark was percolated with acetone, the solvent recovered, the extract treated with water, and the resinous principles filtered off. The filtrate was shaken with several successive portions of ether, which were separated from the aqueous layer, mixed, and spontaneously evaporated. The residue, left after the dissipation of the solvent, yielded reactions and results corresponding to that of gallotannic acid.—Amer. Jour. Pharm., 1894, 280.

HÆMODORACEÆ.

Aletris farinosa.—F. L. James gives an account of the general therapeutical properties and records his observations of its use as a tonic to the female generative organs.—St. Louis Med. and Surg. Jour.; Nat. Drug., 1894, 136.

HYDROPHYLLACEÆ.

Eriodictyon californicum.—The pharmacognosy of, by A. Ferrein, in Pharm. Post, 1894, 106.

IRIDEÆ.

Homeria collina.—D. McAlpine directs attention to the poisonous action of a bulbous plant which has been identified as Homeria collina, var. miniata. It is a native of Cape of Good Hope. It contains an irritant poison, but does not appear to be an alkaloid.—Pharm. Jour. Trans., 1893, 350.

Saffron Parasites.—Figure of a parasite resembling the "itch" parasite found in saffron.—Chem. and Drug., 1894, 552.

Standards of Purity of Saffron.—John Barclay (Pharm. Jour. Trans., 1894, 692) examined 33 samples of saffron and found the mean of all the samples to yield of moisture, 12.37 per cent.; ash, 5.54 per cent.; ash on dry saffron, 6.32 per cent.

Saffron Substitutes—Identification of.—A. Alessi finds that the poisonous Martius yellow can be identified by dissolving in water, precipitating by hydrochloric acid, washing, dissolving the precipitate in ammonia, and adding solution of cyanide of potassium; a precipitate forms which gives when mixed with concentrated sulphuric acid a fine red or violet color, due to the formation of Sommaruga's indophan. This reaction is characteristic for Martius yellow, and distinguishes it from the equally poisonous dinitrocresol and hexanitro-diphenylamine. S. naphthol yellow can be identified by igniting with sodium carbonate and potassium nitrate, and testing for sulphate.—Selmi, 1894, through Chem. Repert., xviii, 132.

LABIATÆ.

American Pennyroyal Oil—Composition of.—C. J. Habhegger obtained an oxime identical with the pulegoneoxime of Beckmann and Pleissner from the oil of Mentha pulegium. Also a benzoylester of pulegoneoxime which crystallizes only in part in needle-shaped crystals, and was only partially soluble in the mixture of benzene and petroleum benzin, or alcohol or ether. The crystals obtained from the mixture of benzene and petroleum benzin melted at 141° C. Those insoluble in this mixture after heating for several hours on a water-bath, melted at 175° C. This discrepancy is explained by assuming that the benzoyl radical replaces the hydrogen of the other hydroxyl group, besides that of the oxyimido group.—Amer. Jour. Phtrm., 1893, 417.

Pycnanthemum lanceolatum—Analysis and Notes on its Ethereal Oil.—H. C. Barker analyzed this plant and found it to contain small quantities of inulin and sugar and notes also the absence of tannin, starch, and either alkaloids or glucosides. The results of the analysis are tabulated. By distillation 1.47 per cent. of oil, calculated for air-dried material, was obtained. Its properties were: Color, pure yellow, of medium depth. Odor, considerably resembling that of pennyroyal. Sp. gr. at 15° C., 0.9361. At 150° C. boiling commenced, very gently. At 205° the ebullition had become rather more brisk, but still was very gentle. Between 210° and 215° it became much stronger. The oil continued to boil for over an hour with the temperature varying between 212° and 216°.

The following color reactions, etc., were observed:

One drop of oil with three drops of concentrated sulphuric acid gave a red-brown color, immediately. To one drop of oil dissolved in about 1 C.c. of chloroform, two drops of sulphuric acid were added. The acid acquired a red-brown color, while the chloroform remained colorless.

One drop of oil with about five drops of strong hydrochloric acid gave no color.

One drop of oil with about 1 C.c. of alcohol, and one drop of hydrochloric acid, gave no color.

One drop of oil with four or five drops of fuming nitric acid gave a red-brown color.

A fragment of iodine was added to a few drops of oil, which acquired a dark red-brown color, but there was no energetic action.

To five drops of oil, .05 Gm. of picric acid was added. This dissolved readily and completely in the cold, forming a solution having a brownish-yellow color, which changed to yellowish green.

A portion of the oil was treated in the following manner:

15 C.c. of the oil were mixed with 12.5 Gm. of sodium hydrate, 40 C.c. of absolute alcohol, and 7 C.c. of water, in a flask, which was connected with an inverted Liebig's condenser, and the contents heated to boiling on a water-bath for over two hours. To the resulting deep red-brown fluid was added an equal volume of alcohol, a current of carbon dioxide passed through, and the precipitated sodium carbonate filtered out.

A portion of the alkaline filtrate was mixed with about five volumes of water, the result being a turbid fluid of a reddish-ochre color. This was agitated with ether, which removed the substance causing the turbidity, forming a red-brown solution, which on evaporation left a red-brown, transparent, soft, resinous residue, having an odor somewhat resembling that of the original oil. This residue slowly hardened, in thin layers forming a varnish-like film.

The alkaline fluid, after having been well shaken out with ether, the operation being repeated several times, was of a brownish-red color, and very nearly clear. It was acidified with dilute sulphuric acid, which caused a yellowish-brown turbidity, the substance to which it was due soon largely coagulating into soft red-brown masses. The whole was shaken with ether, which readily dissolved the red-brown masses, forming a red-brown or brownish-red solution. The acid fluid became clear and nearly colorless. The ethereal solution left, on evaporation, a transparent, resinous substance, at first soft, but slowly hardening, with little or no odor. —Amer. Jour. Pharm., 1894, 65 and 172.

Pycnanthemum linifolium.—H. C. Barker examined this plant chemically and obtained the reactions for the substance extracted by Dr. Mohr and by the latter regarded as a peculiar tannin. He also obtained an appreciable quantity of starch, but no reactions for either alkaloids or glucosides. The results of the author's estimations are tabulated.—Amer. Jour. Pharm., 1894, 169.

LAURINEÆ.

Estimation of Camphor.—M. Manseau gives (Bull. de Pharm. de Bord., 1892, 222) several processes for the estimation of camphor, taking as a basis for them the following experiments: Place 1 or 2 Gm. of camphor, purified by several crystallizations from alcohol, on a small funnel, below which a tared platinum capsule is attached, and add 10 C.c. of 65 per cent. ether, for dissolving the camphor and washing the funnel. Evaporate the ether, and place on a sensitive balance, although the camphor is still moist; if now the precaution is taken to remove the camphor two or three times carefully from the sides of the capsule into the bottom, the exact weight of the camphor will be found again after standing about thirty-five minutes.

Estimation of Camphor in Camphorated Alcohol.—Place 20 Gm. of the camphorated alcohol into a flask of 150 C.c. capacity and add about 100 Gm. of water; the camphor precipitates; add 10 C.c. of 65 per cent. ether and agitate; after several minutes decant the lower layer of the liquid by means of a siphon, place the last 50 C.c. into a bromine tube, decant the ethereal layer, evaporate in the tared platinum capsule, and take the weight of the camphor thirty-five minutes after the visible evaporation of the ether.

Estimation of Camphor in Celluloid.—Dissolve 2 or 3 Gm. of celluloid shavings in a mixture of 10 Gm. strong alcohol and 35 Gm. 65 per cent. ether—with constant agitation, complete solution will be effected in fifteen minutes. Add a large excess of water, when the nitrocellulose and the camphor will be precipitated separately; add 10 C.c. ether and agitate; the gun-cotton powder will form a separating layer between the dissolved camphor and the supernatant ether. Filter through paper previously moistened with ether, place the filtered liquid in a bromine tube to remove the water which may have passed. Decant the ether carefully and finish the operation as in the above process.

Estimation of Camphor in Camphorated Oil or Ointment.—In this process it is necessary to first distil (about 200 C.c.) the fatty body in a current of steam which carries over all of the camphor as well as some fatty acids. Saponify the fatty acids by the addition of several C.c. of solution of caustic soda, and submit the whole to distillation. When 150 C.c. have passed over, treat the resulting liquid with 10 C.c. ether, decant the camphorated ether and proceed as in the other processes.—Amer. Jour. Pharm., 1893, 496.

Constitution of Camphor.—C. Gillet is of opinion that none of the views hitherto put forward as to the constitution of camphor are sufficiently in accordance with its known characters. By condensation of acetone by means of acids or alkalies he has obtained two different forms of phorone analogous to camphor, but containing CH_2 less in the molecule, and Gillet regards camphor as a phorone in which one atom of hydrogen has been replaced by CH_3. By condensation of two molecules of acetone and one of methyl acetone, he has obtained a substance which is crystallizable, capable of being sublimed, and has the appearance, as well as the smell, of camphor.—Apoth. Zeit., ix., 124.

Camphor—Constitution of.—P. Cazeneuve. This paper discusses the evidence generally for the constitution of camphor, and concludes in favor of Kekulé's formula as modified by Haller.—Bull. Soc. Chim., 1893, 38; Jour. Chem. Soc. (Abs.), 1893, 598.

Camphor in the East—The Production and Trade in.—P. L. Simmonds. (Bull. Pharm., 1893, 448.) An account of production and trade in camphor of China, Formosa, Japan, Malay or Borneo, Baros or Sumatra. Attention has been frequently drawn to the fact that the camphor tree has been acclimatized in several of the Southern States, from the distribution of seed by the Agricultural Department. In South Carolina and Florida it seems to flourish. As the plant grows well over a large area in the more Southern States, it is expected that the preparation of its products will ultimately become a profitable industry, and save an outlay of $400,000 or $450,000 for the foreign product.

Australia and New Zealand are already directing attention to the growth of the camphor tree. A hundred young plants have lately been safely taken to Australia.

Judging by the imports, it would seem as if there was a decline in the use of camphor in the United States. Some ten years ago the receipts averaged from two to three million pounds annually, but of late years (though free of duty) the imports are declining. They were in the three last fiscal years as follows:

	Lbs.	Value.
1889	1,961,018	$287,333
1890	2,055,287	420,331
1891	1,716,167	468,060

Camphor Refining in Japan.—With views of natives distilling camphor and compressing resublimed camphor.—Chem. and Drug., July, 1893, 178.

Camphor Trade of Formosa.—Statistics from Consular Reports, 1192, 7. —Pharm. Jour. Trans., 1893, 10.

——— of Japan —Statistics from Cons. Report, 1260; Pharm. Jour. Trans., 266.

Camphor in Nagasaki.—Manufacture and Statistics by U. S. Consul W. H. Abercrombie.—Nat. Drug., 1893, 88.

Caparrapi Balsam.—The plant which yields the caparrapi balsam is a large forest tree, and is described by T. Bayon (Pharm. Jour. and Trans., 1893, No. 1200), as an evergreen tree with aromatic leaves and bark, the fruit and calyx exhaling an odor of cinnamon. The *seed* is oily, and has a burning taste like capsicum. The *balsam* has an aromatic odor; in color it usually resembles balsam of tolu, while it is more fluid than the latter. In medicine it is used by the natives of Cudinamarca, U. S. Colombia, as a stimulant in catarrhal complaints and chronic inflammations; it is also employed in the treatment of snake-bites and the stings of poisonous insects. It is usually applied externally. It is reported that in a case of poisoning by the cayo (a poisonous arachnid)—in which it had accidentally been crushed on the leg, so that the poison was absorbed, the patient lost consciousness and sensibility, and had lock-jaw for 60 hours; and that an external application of caparrapi balsam and a dose of 10 drops taken in 2 Gm. of alcohol and 30 Gm. of water, served to effect a cure.

Cinnamon and Cassia Barks.—Examination by R. Pfister and published in Forschung-Berichte über Lebensmittel und ihre Beziehungen zur Hygiene, über forense Chemie und Pharmacognosie (Vol. I., pp. 6 and 25). The histological examination of these barks has shown that the bark of C. burmanni is identical in structure with that of C. dulce, Nees., C. kiamis, Nees., and C. burmanni var. lanceolata; that C. tamala, Nees. and Eberm., and C. albiflorum, Nees., are the same species; that the bark sent by Dr. Dymock to this Society as that of C. tamala belongs to C. iners.; that the cassia bark from Calcutta ("Mus. Cat.," No. 452, e) is derived from C. tamala; that the Saigon cassia of the New York market is the unscraped bark of C. cassia; and that the true Massoi bark and the false Massoi bark from New Guinea are quite as distinct under the microscope as they are in odor. He also brings out the curious fact that the "Cassiarera" of the continent is that of C. cassia, whilst in this country it is that of C. burmanni and C. tamala, and that the "Cassia lignea" of Continental writers is the bark of C. burmanni and C. tamala, whilst in London it is that of C. cassia; that the China cinnamon of Continental (and American) authors is the bark of C. cassia, and that the China cinnamon of London is the unscraped bark of C. cassia, known in New York as

"Saigon" cinnamon. This unscraped bark is much more aromatic and pungent than the scraped bark.—Pharm. Jour. Trans., 1894, 941.

Cultivation of Cinnamon.—Account in Pharm. Era, 1893, 139.

Actinodaphne hookeri, Meissn., vernacular, Pisa.—This tree yields a saccharine sap, which might be yielded in abundance by systematic tapping. G. G. Prebble, in Pharm. Jour. Trans., 1893, 21.

LEGUMINOSÆ.

Abrus precatorius.—David Hooper obtained from the root a small quantity of a substance resembling glycyrrhizin, a resin, soluble in ethylic and amylic alcohols, chloroform, CS_2 and strong alkalies. He obtained also an organic acid and an alkaloid. The latter not abundant but yielded a volatile product of a very penetrating odor when heated with caustic soda. The resin acid is the chief constituent, and constitutes as much as 8 per cent. of the root. The leaves contain a large proportion of glycyhrrizic acid when compared with other drugs yielding the substance.—Pharm. Jour. Trans., 1894, 937.

Alfalfa.—Cultivation in South America.—Bull. Pharm., 1894, 139.

Cassia siberiana, D. C.—Used as a diuretic in West Africa, where it is called "Guamgua."—Amer. Drug. and Pharm. Rec., 1893, 313.

Chrysarobin and Chrysophanic Acid.—In regard to the definition of these substances, G. B. Schmidt criticises the statements made in several pharmacopœias, and comes to the conclusion that the distinction of them is far from being satisfactory. He considers the description given by A. Andouard (Nouveaux elements de Pharmacie), to be the best definition of chrysarobin. The remarkable discrepancy of the statements made by several authors as to the coloration produced by solution in sulphuric acid or in caustic potash appears to show that the tendency to oxidation has led to erroneous inferences, and in any case Schmidt considers that the dispensing of chrysarobin in place of chrysophanic acid is inadmissible. That was allowed by the previous edition of the German Pharmacopœia, but has been corrected in the present edition. Andouard describes chrysophanic acid as follows; $C_{15}H_{10}O_4$, golden yellow klinorhombic prisms, melting at 162° C., nearly tasteless, insoluble in water, soluble in 224 parts boiling alcohol of 81 per cent., or in 1125 parts of 30 per cent. alcohol. Acetic acid, chloroform, and benzene also dissolve the acid. It is also readily soluble in alkaline solutions, to which it gives a dark red color. With sulphuric acid it gives a red color, and with melted caustic potash a blue color. These reactions distinguish chrysophanic acid from chrysarobin, which gives a yellow color with sulphuric acid and a brown color with caustic potash.—Pharm. Weekblad., through Pharm. Zeitung. xxxix., 345.

Peru Balsam Copaiba.—F. Musset (Pharm. Centralh., 1893, 720), considers the lime test very valuable. He mixes about equal parts of stiff milk of lime with the suspected balsam, and obtains at once a crumbling mass, which on warming changes to a friable powder.

Tests for Balsam Copaiba.—See Amer. Drug. and Pharm. Rec., 1893, 329.

African Copaiba.—J. C. Umney has further examined the volatile oil and crystalline and other resins from the African copaiba (See Proc., 1893), and compared them with those obtained from South American copaiba. The average yield of volatile oil obtained by distillation with steam from the samples of African copaiba examined was 39 per cent. The oil was of a pale yellow color, had a specific gravity of 0.9185 at 16° C., and a rotation of + 20.42° with a tube 20 Cm. long at 16° C. It is soluble in its own weight of petroleum ether in three parts of ether, 7 of glacial acetic acid, but is not completely soluble in 50 parts of rectified spirit or absolute alcohol. No crystalline product was obtained on passing chlorine through the oil.

The dry oil yielded on fractionation over metallic sodium a blue oil boiling at 260° C., and agreeing with that obtained by Brix (Jahresbericht, 1881, p. 1028), from the Maracaibo variety. It may be noted that this blue oil can only be obtained from the perfectly dry oil, several attempts on the moist oil resulting in failure.

Distilled with dichromate of potash and sulphuric acid a bluish-green oil is obtained at 265° C., the thermometer falling rapidly.

The original oil reduces rapidly and powerfully a solution of gold chloride in chloroform containing 1 per cent. of absolute alcohol, and the "iodine absorption" in sixteen hours is 251.8.

The fraction boiling at 264° C. was heated for twenty-four hours in the manner described by Wallach, with glacial acetic acid, sulphuric acid and water and the dark resulting liquid subsequently distilled in a current of steam. From no fraction, however, on cooling could a crystalline hydrate be obtained. From the fraction of South American copaiba oil, boiling at about 260°, a small quantity of a crystalline hydrate was obtained, agreeing in properties with the sesquiterpene hydrate obtained by the previously mentioned worker. No crystalline halogen compounds could be obtained direct from that fraction of the oil.

A comparison of the physiological action between the oils from the African and South American oleoresins is summarized by E. H. Fenwick as follows: "The oil possesses undoubted therapeutic powers, all the patients, with one exception, acknowledging much benefit from its exhibition. I am told by patients that it is less nauseous to take, repeats less, but is less potent in its effects than the copaiba oil at present in the market (South American). I have used it in prostatic inflammation, fresh and chronic urethritis, stricture and pyelitis."

Reference has been made in the previous communication to the crystalline substance deposited from the crude oleo-resin, which by recrystallization from petroleum ether, was obtained almost colorless. The crystals are distinctly acid to litmus, electrical by friction and melt at 124° C. The properties are similar in many respects to those possessed by the oxycopaivic acid, separated by Fehling from a deposit from the Para variety of the oleo resin.

From these experiments it will be seen that in many respects the so-called African copaiba corresponds with that imported from South America, and points to the possibility of its being derived from one of the Copaifera, which are known to exist in tropical Africa.—Pharm. Jour. Trans., 1893, 215.

African Copaiba Tree.—F. A. Flückiger contributes to the knowledge of species yielding copaiba and the products in the Colonial Museum at Marseilles.—Pharm. Post, 1893, 613.

Copaifera salikounda.—Heck.—It possesses paripinnate leaves with 3 to 5 pairs of opposite leaflets, thus differing from the African species possessing trifoliate leaves, and differs from the American C. langsdorffii in the less anastomosing veinlets, in the absence of secreting cells in the leaves and stem, etc. It thus forms an interesting link between the African and American species. A chemical examination of the beans showed that the seed without the integuments contained 0.80 per cent. of coumarin, and the seed coats only 0.27 per cent. The seeds contained also 4.12 per cent. of oil, together with starch, sugar, albumen, and coloring matter, traces of tannin, whilst in the seed coat the ash contained much manganese.

On a comparison being made with Tonka beans, the seeds of the latter deprived of their coats yielded 1.233 per cent. of coumarin and 37.933 per cent. of oil, and the integuments 3.158 per cent. of coumarin and .004 per cent. of oil. The seeds also contain manganese. It thus appears that the integument of the Salikounda seed is not quite so rich in coumarin as the seed itself, whilst in the Tonka bean the seed coats contain more than twice as much as the seed itself, and the Tonka bean contains 17–18 times as much coumarin as the Salikounda bean.—Pharm. Jour. Trans., 1893, 422; from Ann. Fac. des Sci. de Marseille.

Dragon's Blood.—Flückiger anticipates that it belongs to the numerous class of kinos, the exudations of several species of Eucalyptus, as well as of Pterocarpus marsupium and other trees. Whether they are chemically identical or not remains to be studied.—Pharm. Jour. Trans., 1893, 108.

——— A contribution to the history.—Ibid., 47: from Gardner's Chronicle.

Goa Powder and Chrysarobin.—E. J. Millard has further examined crude Goa powder, and obtains results that clearly indicate that the adulteration is not in any way due to excess of woody matter, but to sand and oxide of iron mixed with the powder. Regarding chrysarobin, not a single commercial sample was soluble to a larger extent than about 60 per cent. in hot rectified spirit.—Chem. and Drug., July, 1893, 174.

Gurjun Balsam in Copaiba Balsam.—Detection by two methods proposed by E. Hirschsohn, in Pharm. Ztschr. f. Russland, 1893, No. 43. If 2–4 drops of the suspected balsam be added to 1–2 C.c. of a solution of 1.0 pure concentrated sulphuric acid in 25.0 pure acetic ether, no red or violet coloration should be produced. The different varieties of copaiba with this test give only a yellow or pale brownish-yellow color, but the addition of 10 per cent. gurjun balsam to copaiba causes a red coloration gradually changing to a reddish violet. A second method of applying the test was devised after ascertaining that the substance causing the red color is at least partly soluble in water. One volume of the balsam is agitated several times at the ordinary temperature with 3–4 volumes of water, filtered through a wetted filter and the filtrate mixed with an equal volume of hydrochloric acid of specific gravity 1.12; no red coloration should develop in the course of fifteen minutes. Pure copaiba by this modification fails to give any color, but if containing 10 per cent. gurjun balsam, the red color develops in a few minutes; if containing 20 per cent. gurjun balsam, the color is more intense and is more quickly developed.—Apoth. Ztg., 1893, 565.

Uncaria gambier, Roxb.—J. G. Prebble records the importation into Bombay from Singapore of a sophisticated gambier in free cubes containing a large percentage of starch. In appearance it is cleaner than the genuine drug, the cubes are more regular and not broken or fused at the edges, and the color is of a uniform dark cinnamon brown externally, paler on the inside. With ether 26 per cent. of soluble matter is obtained. Under the microscope no regular crystals are obtained, but a fine granular mass of starch which does not polarize.—Pharm. Jour. Trans., 1893, 21.

Gambier—Borneo.—A sample of Gambier cultivated in British North Borneo contained 19.86 per cent. tannin. Properly dried and prepared material indicated as much as 27.85 per cent., and as a result the cultivation is being extended.—Pharm. Jour. Trans., 1893, 81; Kew Bull., 78, 139.

To Distinguish Catechu from Gambier.—M. Gibson has recourse to a microscopical examination for the anatomical structures of the two drugs, gambier being prepared from the young twigs of Uncaria gambier bearing the leaves and flowers, while catechu is obtained from the central portion of the trunk of Acacia catechu. He dissolves the drug either in an alkali or in 30 per cent. acetic acid, and then examines the insoluble residue.—Jour. de Connais. Méd.; Rép. de Pharm., 1893, 533.

Gambier in Singapore.—Production and cultivation. U. S. Consul in Jour. Soc. Arts., 1893.

East African Gum.—C. Hartwich reports upon a gum resembling tragacanth recently sent from East Africa. It differs from tragacanth in containing comparatively few pieces of the characteristic flattened shape of true tragacanth; the majority consisted of rounded or pear-shaped whitish masses; the gum swelled to a stiff jelly with 200 times its weight of water, and was soluble only after prolonged boiling with much water. It appeared to consist mostly of bassorin, the formation of which began in the middle lamella, and proceeded to the primary and secondary deposits in the cell-walls. From the mode of formation of the gum, and the anatomical characters of the fragments of bark found in it, the conclusion was drawn that it was produced by a species of sterculia.—Archiv. der Pharm., 1894, 43.

Polarimetric Examination of Gums.—Guichard has examined the rotatory powers of the various acacia gums in the market, and finds that they form three series: those of Galam, Mogador, and Australia have a rotatory power near + 16°. Arabic, Aden, and Amrad gums border upon + 32°, while gum Ghatti has a rotatory power close upon + 64°. The differences may be explained by the view that the gums are mixtures of several dextro-rotatory and lævo-rotatory substances.—Chem. and Drug., 1893, 144.

Detection of Dextrine in Gums.—To detect dextrine in gums, Pietro Palladino heats the sample to ebulition for a minute with aniline sulphate, chloro-brucine, pure brucine orceine, or orceine. With these reagents, pure gum in a potassic solution gives a pale straw color, which becomes a little greenish, while gums containing dextrine take a yellowish orange or a brownish red color.—Amer. Drug. and Pharm. Rec., 1894, 328.

Gum Trade of Senegal.—Depots of gums, manner of packing and amount exported.—Nat. Drug., 1893, 117; from Pharm. Post, 1893.

Australian Native Gums.—Time for tapping trees, and trees yielding commercial gums.—Chem. and Drug., 1893, 514.

Acacia farnesiana.—According to J. G. Prebble, the gum collected by him from trees growing in the neighborhood of Bombay dissolves at first, but on standing a short time it gelatinizes, and on adding more water a thick gelatinous fluid is formed.—Pharm. Jour. Trans., 1893, 22.

Acacia digyna.—The fruits of this plant have been sent into the London market recently from India under the name of taripods, and a chemical examination of them seems to indicate their probable usefulness in the arts. The drug contains one-third of its weight of a tannin which is suitable for preparing a leather of a light color; it seems probable that it may also be of use in the preparation of ink.—Drug. Circ., 1893, 226.

Decline in Gum-Arabic Trade and its Lesson.—The constant decrease of demand for gum-arabic is due mainly, and almost solely, to the discovery of cheaper substitutes for the gum in the arts and industries, and these substitutes have proven so satisfactory that, notwithstanding the present low prices, there is a demand for only 10,000 quintals per annum, or only one quarter of the amount of gum needed in 1881. The probability is that had the scarcity, and consequent enormously high prices, not occurred, the world would have continued to use 40,000 or 50,000 quintals per annum, and the effective substitutes would still be unknown. —Nat. Drug., 1894, 70; from Pharm. Post, 1894.

The Australian Acacia-gum Trade.—A company for the preparation and sale of Australian acacia-gums, which was formed in Victoria at the beginning of 1891, appears to be in a very flourishing condition. The gum is collected by farmers, from whom it is purchased at varying prices, from 2*d.* a pound upwards according to quality; is then purified by a specially-patented process, of which Mr. A. N. Pearson, the Government agricultural chemist, was one of the inventors. There is a large sale for it among the stationers in Victoria, and it is alleged that it is superior to the best imported mucilage at about the same cost. The next step in the development of the industry will be to push its use for the manufacture of confectionery.—Chem. and Drug., 1893, 514.

Gums—East Indian.—The exports of gums of Indian origin from Bombay far exceeds those imported into Bombay from African ports.

——— *Sind.*—In 1891–92, 4108 cwt. of gums were exported from Karachi.

Tragacanth at Bagdad.—There has been considerable increase in the trade in tragacanth, which comes from Persia and Sulimania. The supply has been large, and everything brought to market was eagerly bought up, owing to the high prices ruling in the London market. Tragacanth was almost unknown in the district some years ago, but now it is one of the principal exports of the country and promises to become of greater importance every year.—Pharm. Jour. Trans., 1894, 624; from F. O. Annual Series, 1320.

Indigo Cultivation in the Straits Settlements.—Board of Trade Jour.; Pharm. Jour. Trans., 1893, 404.

Liquorice Trade of Aleppo.—Statistics from Consular Reports, 1200.—Pharm. Jour. Trans., 1893, 67.

Liquorice in the Caucasus.—Extract from U. S. Report, in Kew Bull., on production and amount produced.—Ibid., 326.

The Trade in Liquorice.—P. L. Simmonds describes the root and manner of shipment of the three grades, cultivation in England and imports.—Bull. Pharm., 1894, 205.

Loco, or Crazy Weed.—J. U. Lloyd writes a comprehensive article on the history, discovery, physiological action, constituents, mechanical irritation, poisonous admixtures, etc., with a bibliography.—Electric Med. Jour.; Pacific Drug., 1893, 100.

Loco Weed.—W. T. Parker in Science, 1894, 101.

Spontaneous Ignition of Lupulin.—On one of the transatlantic steamers just about ready to sail, smoke was seen to issue from a box; upon opening, to see the cause, the material, lupulin, burst into flame. The lupulin had been sent from some part of Bavaria, and was to be shipped to this country. The unconsumed portion was found to be thoroughly caked, due to the presence of moisture, and thus furnished the cause of the ignition: a material, rich in oil; moisture; large quantity and considerable time of storage, by which the heat generated by the slow oxidation of the oil, was so much increased that it reached the ignition temperature.—Südd. Apotheker Ztg., 1893, 466.

The Peanut.—Its value as a nutriment. From the table given we glean that in the peanut we have the cheapest and at the same time the most powerful nutriment, weight for weight, hitherto introduced into the diet of man.—Nat. Drug., 1894, Feb.

Balsam of Peru.—H. Trog has examined balsam of Peru, and found that the fluid portion of the balsam consists almost entirely of benzyl benzoate, only a very small proportion of benzyl cinnamate being present. Neither phenylpropyl cinnamate, styracin, free benzyl, alcohol, or benzoic acid, could be detected; on the other hand, free cinnamic acid and vanillin were present. The resin proved to be an ester. By saponification it yielded cinnamic with a little benzoic acid and a resin alcohol, peruresino-tannol, probably derived from a tannin. The bark of the tree contained minute quantities of phloroglucin, tannin, phlobaphene, wax, and non-saponifiable resin. In very young twigs, resin-ducts were found, but these were soon thrown off in the growth of the plant, and no others formed. Balsam of Peru is, therefore, like benzoin, a pathological product.—Archiv., ccxxxii., 71.

Tests for Balsam of Peru.—The petroleum ether extract behaves indifferently toward a solution of copper acetate. Therefore if the balsam is adulterated with rosin, turpentine, or canada-balsam, the petroleum-ether extract (1 : 5) when shaken with an aqueous solution of copper acetate will be colored blue green, so that an adulteration of this kind can be quickly and positively detected. A good balsam should stand the following tests:

1. On mixing the balsam with half its volume of calcium hydroxide, and warming in a water bath for half hour, a solid mass should not result.

2. One volume of balsam if mixed with 4 volumes of 80 per cent. acetic acid should give an opalescent, or only slightly turbid solution, from which no oily drops separate, even after two hours.

3. The petroleum ether extract, when shaken with an aqueous solution of copper acetate, is not colored blue green or green.

4. The petroleum ether extract after evaporating the solvent should not be colored when hydrochloric acid of the sp. gr. 1.19 is poured over it.—Pharm. Zeitschr. f. Russl., 1893, 32, 369, 401.

Tests for Peru Balsam.—F. Musset mixes with a solution of calcium hydroxide. The mass, in case of impurities, became hard and brittle.—Pharm. Centralh., 1893, 790; Chem. Zeit., 1893 (Rep.), 329.

——— According to Wimmel (Apoth. Zeit., 1893, 443), pure balsam Peru has a sp. gr. never below 1.138 nor above 1.150, and should respond to the ammonia test, and its benzin extract should respond to the nitric acid reaction. This, of course, in addition to standing an examination as to color, taste, odor, etc.

The Hydrochloric Acid Test for Peru Balsam.—O. Schade suggests the modification of the test to the extent that the petroleum benzin extract be heated for at least 10 minutes in the water-bath. This solution in benzin with HCl gives the yellowish coloration of true Peru balsam.—Pharm. Zeit., 1894, 214; Chem. Zeit. (Rep.), 1894, 96.

Peruvian Balsam.—G. J. Dawson, in U. S. Consular Reports on the agricultural resources of Salvador, gives origin of name and manner of collecting.—See Drug. Circ., 1894, 36; Pacific Drug., 1894, 18; Amer. Drug. and Pharm. Rec., 1894, 298.

Senna—A False.—H. G. Greenish examined a leaf supposed to be yielded by the Pistacia lentiscus (Anacardiaceæ). The midrib of true leaves of Pistacia on transverse section possess in the soft bast the principal fibro-vascular bundle, and towards the under surface several (3) oleoresin ducts. The secondary nerves contain usually one duct only. These ducts are of schizogenous origin, lined with a tapetal layer of secreting cells, and contain drops of oleo-resins. This is the typical feature of the Anacardiaceæ, viz., the presence of schizogenous ducts in the soft bast only. The specimen sent to Mr. Greenish, on making a transverse section of the midrib, exhibited a crescent-shaped f. v. bundle with the bast toward the under surfaces, supplemented by a smaller bundle with the bast directed towards the upper surface of the leaf. In the mesophyll there was one row of palisade cells and an occasional lysigenous oil-gland. The lysigenous oil-glands are characteristic of Rutaceæ. Upon further examination it was decided to be either a Xanthoxylum or closely allied to it.—Pharm. Jour. Trans., 1893, 382.

——— The leaves above referred to were those of Pistacia lentiscus, and had been inadvertently confused with another sample.—Ibid., 428, 440.

——— W. T. T. Dyer remarks upon the above specimen of Pilocarpus. Ibid., 421.

Senna Pods.—These are now sold in the London markets, and, contrary to the old belief, they have been found to have the same properties, and to be probably little, if any, inferior to Senna leaves.—H. H. Rusby, in Alumni Jour., 1894, 49.

White Hellebore Adulteration.—Henry G. Greenish (Phar. Jour. Trans., 1894, 873), has called attention to an adulterated bale of white hellebore recently received by a London firm from Genoa, and said to have been collected in northern Italy. The adulterant is a rhizome, about one and a half inches in length and half an inch in thickness; it is erect, or nearly so, and often crowned with the brownish remains of smooth amplexicaul leaf bases, or sometimes with the fibres left after their decay. To this rhizome numerous roots, varying generally from three to six inches in length, are attached; near to the rhizome they exhibit a fusiform tuberous enlargement two to four inches long and three-eighths to three-fourths of an inch thick, tapering abruptly to about crow-quill size, and then assuming the shape of an Indian club. This fusiform enlargement of the root is sufficient to distinguish the root from white hellebore. The drug is certainly liliaceous. Many plants belonging to the natural order Liliaceæ are characterized by their swollen tuberous roots; the drug in question is probably derived from Asphodelus albus, Willd., a plant enjoying a wide distribution over Southern Europe.

Poisonous Leguminous Seed.—J. A. Voelcker calls attention to the occurrence of a poisonous leguminous seed in Indian peas. The seed was ovate or wedge-shaped, flattened on two sides, had a very mottled or "marbled" appearance, and a thin black line ran over about two-thirds of its circumference. On examination it proved to be the seed of Lathyrus sativus, L., or "khesári" pulse, which has been known to produce paralysis when eaten to excess. Seeds somewhat resembling those of L. sativus frequently occur among the ordinary varieties of Pisum sativum or P. arvense, and must not be confounded with them.—Analyst, 1893, 102.

LICHENI.

The Edible Lichen of Japan.—M. Miyoshi, of Tokio, describes (Botanisches Centralblatt, 1893, 161–163) the edible lichen of Japan known as "iwataku," and names it Gyrophora esculenta, sp. nov. It owes its economical value to the large amount of starch and of gelatinous substance which it contains. It has no bitter taste nor purgative properties. It is very abundant in some parts of Japan, growing especially on moist granite rocks in mountainous districts, which it frequently entirely covers. It is collected in large quantities by the mountaineers, dried and sent into the towns, whence a considerable amount is exported. It is largely used as a condiment in Japanese cookery.

Crystalline Acid from Lichen (Thamnolic Acid).—W. Zopf has prepared, from Thamnolia vermicularis, a compound which he proposes to term thamnolic acid, to the presence of which the plant owes its light color. The lichen is extracted with dilute soda, the solution acidified with hydrochloric acid, and the precipitate crystallized from methyl alcohol; it melts at 202–204° C. with decomposition.—Chem. Central., 1893, 54; from Hedwigia, 1893, 66.

Parmelia parietina, Ach.—(Physcia parietina Körb).—R. Kobert has examined the lichen to see if it was poisonous, and finds the vulpinic acid contained therein to be highly poisonous.—Zeitschr. Oest. Apoth.-Ver., 1894, 30.

Intercellular Communication in Lichens.—G. Paviault, in Compt. rend., cxviii, 1362, has discovered the same.

LILIACEÆ.

Scarcity of Cape and Curacao Aloes.—"Cape aloes, rather because of the heavy production of the Curacao variety (which is, to some extent, a competing kind) than on account of any excessive output in South Africa, has also suffered a depreciation which would not have been thought possible some years ago; and although since the autumn of last year the price of the best description has risen from 25 to 30 per cent. by slow stages, it is even now below the level it has ever been known to touch previous to 1887. The statistical table, which we publish below, and which has been carefully compiled from our records, shows the chief fluctuations in the London market-price of good, bright, hard Cape aloes for the last eighteen years, and may be studied with advantage by dealers interested in the drug:"

Year.	Jan.–Feb.	March–April.	May-June.	July–August.	Sept.–October.	Nov.–Dec.
1876	39/	36/–39	40/–44	—	48	50
1877	51/–50	48	49	59/6	54	51
1878	49/	40	43	—	50	44
1879	38/	46/	50	—	55/–60	44/
1880	40/	46	46	—	45	—
1881	43/	47	—	52	64	—
1882	48/–49/	60/–62	62/–63/	90/–70	55/–56	46
1883	46	56	67/6	52	—	45
1884	50	—	47	—	—	38
1885	34/	38/–40/	42	41/–40	—	29/–30
1886	33/	—	33/	—	33/–34	—
1887	25/	28	30/–27	30/	—	—
1888	24/	22	—	21/–22/	—	—
1889	21/6	20/	—	30	—	30
1890	27/6	25/–26	23/6	24	20/6–21	—
1891	21/6	20/6–21/	—	28/–30	19	—
1892	19/–19/6	—	25	22/–23	20/6–21	22
1893	21	23	30	—	—	—

—Chem. and Drug., 1894, 49.

Methyl-Mercaptan in Asparagus.—The peculiar, offensive odor of urine following the eating of the popular succulent vegetable asparagus is due to methyl-mercaptan, according to Nencki. This is the same odor generated in the manufacture of sulphonal, on which account the manufacture of that drug on a large scale was at first delayed until accommodations be prepared to save the community's olfactory organs the offense.—Notes on New Rem., 1893, 63.

Scilla Maritima.—In extracting the principle, which S. Wanizewski names *scillinine*, of the composition $C_{12}H_{10}O_{10}$, which Riche and Rémont called scilline, the author obtained a principle of complex composition, which he purified by washing first with water, then with chloroform. In each of these liquids he found a new body soluble in alcohol like scillinine; the principle soluble in water he named *scillapicrine*, that extracted from the chloroform washing *scillamarine*. He mentions also the existence of a fourth principle, which is insoluble in alcohol and in dilute alcohol, very soluble in water, very bitter, and difficultly isolated.—L'Union Pharm.; Jour. de Pharm. d'Anvers, 1893, 252; Amer. Jour. Pharm., 1893, 498.

Recent Contributions to the Knowledge of Squill.—E. von Jarmerstedt gave the first process for isolating the bitter principle. Schmiedeberg placed scillain in the pharmacological group containing digitalin. He also named a mucilage *sinistrin*. A. Weyher von Reidemeister prepares *sinistrin* by another process. Riche and Rémont have also described sinistrin under the name of scillin, and obtained it by the expression of fresh squill, which they claim contains more scillin (sinistrin) than the dried bulbs; they obtained from fresh squill (containing about 75 per cent. water), almost 30 per cent., calculated to perfectly dry squill. The expressed juice was neutralized with chalk and evaporated under reduced pressure, to syrupy consistence; by the addition of an equal volume of alcohol, they separated mucilage, and in the clear decanted liquid, the addition of six volumes of alcohol precipitated the sinistrin, which was freed from sugar and inorganic salts by repeatedly dissolving in water, and precipitating with alcohol; so purified, it did not yield mucic acid by boiling with nitric acid.

Franz Kurtz, in a recent inaugural dissertation presented to the university at Erlangen, makes an investigation of the bitter principle scillain and the carbohydrates. In a study of von Jarmerstedt's method of extracting the bitter principle from both fresh and dried bulbs, mention is made of the relatively small yield; the difficulty of extracting the tannin compound of the bitter principle with alcohol because this is so tenacious that it cannot be powdered; and the prolonged exposure of the bitter principle to numerous reagents. To determine the most suitable solvent for the bitter principle, extractions were made with distilled water, hot 90 per cent. alcohol and ether; alcohol proved the best solvent.

The bitter principle oxidized by heating on a water-bath an aqueous solution with potassium dichromate and sulphuric acid and distilling in a current of steam gave but one recognizable product, butyric acid; the green-colored liquid left in the retort, after cooling, was agitated with ether, but the latter upon evaporation left no residue.

The substance separating in the cooling of the hot alcohol extraction of the bulb is described as a dark-brown, tough, glutinous mass, readily soluble in water, but now only partly soluble in alcohol; it was boiled, using a reflux condenser, for several days with 90 per cent. alcohol, whereby the color was much improved but only partial solution was effected; after filtering, the alcohol was largely recovered by distillation, the residual liquid mixed with water, the solution first decolorized by animal charcoal, then evaporated to dryness and the sweet residue boiled with methyl alcohol. The addition of ether to this methyl alcohol solution gave a white flocculent precipitate, which purified by solution and reprecipitation had the same properties (except the reducing value, which equalled 0.649 Gm. Cu.) as described under one of the decomposition products of the bitter principle; this body is one of the glucose group and most probably dextrose.

The portion of the substance insoluble in methyl alcohol was easily soluble in water, the solution having the following properties: No change with iodine or Fehling's solution; it turned the plane of polarization to the left; by the action of diastase a reducing sugar was produced. Dried at 90° C., the finely powdered substance had the composition: C 44.265 per cent., H 6.175 per cent., O (by difference) 49.56 per cent., agreeing to the formula $C_6H_{10}O_5$ or a multiple of this. By prolonged heating with dilute hydrochloric acid on a water-bath laevulinic acid is produced, along with humic substances; by oxidation with nitric acid either saccharic or oxalic acid can be obtained, dependent upon the strength of the nitric acid. To determine if the molecule contained representatives of other related carbohydrate groups, tests were applied for laevulose, galactose and xylose, but with negative results. This investigation of the precipitate obtained from the hot alcohol extraction of squill establishes the presence of two carbohydrates, one of which is dextrose, the other is a member of the group $C_6H_{10}O_5$.—F. X. Moerk, in Amer. Jour. Pharm., 1894, 246.

Sarsaparilla—A Spurious.—H. G. Greenish examined a specimen offered as sarsaparilla. It was three feet in length and showed here and there a rootlet, as well as the remains of aerial stems. Under a low power the transverse section shows an external brown layer, consisting of several rows of brown or yellow, slightly thickened parenchymatous cells, enclosing a ground tissue loaded with starch, in which are embedded two plates of brown prosenchymatous fibres. Between these plates are situated the two principal f. v. bundles; arranged in a circle nearer the periphery are a varying number of smaller bundles. Each bundle consists mainly of an internal mass of vessels and wood parenchyma, the xylem, completely surrounded by a narrow ring of bast, containing sieve-tubes and cambiform cells. This is followed by a row of parenchymatous cells with starch, and the whole is enclosed by an endodermis. On separating the tissue into its component cells, the *vessels are seen to be scalariform* and the *sieve-tubes acutely pointed.* This construction indicates clearly that the drug is the rhizome of a fern. For further discussion see Pharm. Jour. Trans., 1893, 383.

False Sarsaparilla.—C. Hartwich describes a false sarsaparilla from Jamaica that has recently made its appearance in Hamburg. It consisted of cylindrical pieces of root, measuring up to 19 inches in length and three-sixteenths to three-quarters of an inch in thickness, and brown or grayish-brown in color. The large pieces were covered with projections which proved to be small galls. The cortex of the root contained numerous schizo-lysigenous ducts, which were surrounded by a schlerenchymatous sheath, and in the earlier stages were filled with resin. The central column showed a very small pith, radial fibro-vascular bundles, and numerous resin ducts. The root was identified by these characters as a Philodendron, but the species could not be determined.—Arch. der Pharm., 1894, 42.

LINEÆ.

Erythroxylon Coca.—J. D. Hooker, in Curtis' Bot. Mag., 50, t. 7334.

Coca Exports.—C. Markham, on the total value of exports of coca from Peru. In 1892, he said it was 120,727 soles, representing 128,543 kilos of leaves, of which Germany took 86,000, the United States 22,000, and England 1,380 kilos. Of cocaine the exports were 3,300 kilos, worth 195,000 soles, all of which, with the exception of 154 kilos, went to Germany.—Bull. Pharm., 1894, 165.

LOGANIACEÆ.

Blay-hitam.—H. and C. G. Stentesson have subjected this bark, used in the Malay Peninsula in the preparation of "ipoh arrow poison" to a pharmaceutical and chemical examination. From the anatomical characters of the bark and the wood, they believe it to be derived from a species of strychnos which they were unable to determine. The principal alkaloid present was brucine : strychnine could not be detected.—Arch. de Pharm., 1894, 591.

MAGNOLIACEÆ.

Coto Bark—A Report on.—W. Elborne communicates a preliminary report on coto bark, which resulted from inquiries that had been instituted with the object of ascertaining its botanical origin. Genuine coto bark was not often met with in commerce. There was, however, a more frequently occurring bark very analogous in physical appearance and structure, evidently closely allied botanically to the true coto, and termed paracoto bark. The latter does not contain the active principle (cotoin) of the true bark, and can only be distinguished from coto by a chemical analysis. The amount of active principles yielded by coto and paracoto respectively is approximately as follows :

Coto bark, from 1.28 to 1.5 per cent. of cotoin.
Paracoto bark, 1.25 per cent. of paracotoin.
Paracoto bark, .012 per cent. of oxyleucotin.

Paracoto bark, .025 per cent. of leucotin.

Paracoto bark, .009 per cent. of dibenzoylhydrocotoin.

Paracoto bark, .008 per cent. of hydrocotoin.—Pharm. Jour. Trans., 1893, 168.

Coto Bark—Constituents of.—O. Hesse. A continuation of the discussion with Ciamician and Silber. Mixtures of "methylprotocotoïn" ("oxyleucotin"), and "methylhydrocotoïn" ("benzoylhydrocotoin"), or of "isomethylhydrocotoïn," resembles "leucotin," both in appearance and melting point, but the melting point of leucotin is constant, whilst that of the mixture is not. The remainder of the paper deals with "paracotoïn," "bromoparacotoïn," "paracotoïnic acid," "cotoïn," and "dicotoïn.—Ber. d. Chem. Ges., 1893, 2790.

New Constituent of True Coto Bark.—G. Ciamician and P. Silber, (Ber. d. Chem. Ges, 1894, 841). The substance which forms the subject of this paper was obtained in the purification of cotoïn on the larger scale. It forms yellowish crystals melting at 66–88° C., and has the formula $C_{11}H_8O_2$. In chemical properties, it is closely allied to paracotoïn, which the authors consider to be dioxymethylenephenylcoumalin, but it differs from it by the absence of the dioxymethylene group, so that it receives the name, (provisionally) of phenylcoumalin. It may be purified by treatment with hydrobromic acid, which forms an unstable compound with it, and this decomposes gradually, leaving the original substance, which then only requires to be freed from acid by dissolving it in alcohol and precipitating with water. It is readily soluble in ether, alcohol, acetic acid, etc., but only very sparingly soluble in water. It dissolves in alkalies and alkali carbonates, yellow solutions being formed, which smell of acetophenone. Sulphuric acid in the cold dissolves the compound without alteration. It is, moreover, not acted on by acetic anhydrïde or hydriodic acid, and therefore does not contain hydroxyl or methoxyl groups.

Illicium religiosum.—J. G. Prebble records that true star anise is now hardly obtainable either in Bombay or Calcutta, and that it is all sent direct from Singapore to Europe. The Illicium religiosum is imported and used by the natives with other spices.—Pharm. Jour. Trans., 1893, 21.

MARANTACEÆ.

Brazilian Marantaceæ.—T. Peckolt (Pharm. Rund., 1894, 87) enumerates the following:

(1) *Calathea grandiflora.* It is a thick-stemmed plant with numerous branches and about one metre high. The extended sheaths of the lowermost leaves are 10 centimetres wide at their base. The large, long-pedicled leaves attain a length of about 2 metres; they are elliptic, abruptly pointed at their rounded-off upper part, green on the upper surface and greenish-gray on the lower. The blossoms are of a bright yellow color. The new leaves are covered with a whitish, resinous powder, which is

scraped off and used therapeutically (a point of a knife full per dose) in retention of urine.

(2) *Calathea zebrina.* Its bulbous rhizome forms leafy shrubs; the leaf-stalks are 50–60 centimetres high, furrowed and bright green. The leaves attain a length of 40–50 centimetres and a central width of 22 centimetres; they are oblong, elliptical, and rounded-off above; their upper surface is of a velvety dark green, and the lower one of a light violet-red color; while the midrib on both sides and the 14 lateral ribs have broad, bright green edges. The blossoms are in pairs, purple-colored, turning white later on. The rhizome contains starch, and is eaten by the Indians, boiled or roasted. The decoction is a popular remedy in diarrhœa.

(3) *Calathea tuberosa.* From the rhizome sprout rootlets, which spread as they reach the surface of the ground, then penetrate the latter, and thicken into an ovular bulb. The long-pedicled, lanceolate leaves are dark-green on the upper surface and violet on the lower. The blossoms are of a fire-red color. The root-bulbs of this plant are also eaten by the Indians. The country people employ the crushed bulbs and rhizome as detergent poultices to wounds.

(4) *Thalia geniculata.* This plant is about 2 metres high; its petioles are long and sheathed, its blossoms lilac in color. Its bulbous rhizome serves as food to the Indians; and it is used, freshly crushed, on wounds, as a detergent; its decoction is employed as a diuretic.

(5) *Maranta arundinacea.* The boiled or roasted bulb serves as food to the Indians; the expressed juice of the freshly grated bulb is used as poultices to wounds inflicted by poisoned arrows, and generally in inflammation caused by insect stings. The slightly roasted rhizome is eaten by the country people, and the expressed juice of the fresh bulb is believed to cure malarial fever.

(6) *Maranta gibba.* A creeping rhizome with dichotomous, ramified, abundantly foliaged stalks; its petioles are long, and its blossoms yellowish-white. Its rhizome is roasted and used as food by the Indians, and the concentrated decoction is employed, in cupful doses, as a popular remedy against retention of urine.

(7) *Stromanthe sanguinea.*—A handsome plant with thick fleshy rhizome and a tall stalk, thickened at the knots. The large root-leaves have long petioles and measure about a metre in length; the coupled, lanceolate stalk-leaves are 30 Cm. lomg, surrounded, for half their length, by a sheath 2 Cm. wide; glossy dark-green on their upper surfaces, somewhat lighter at the midrib, and blood-red on the under surface. Its blossoms are carmine-red in color. The young and tender leaves are used as vegetables; the juice of the expressed leaves serves as a poultice in inflammatory affections of the throat; and the decoction of the rhizome (1 in 10) is taken in vesical catarrh, in cupful doses, 3 times daily.

(8) *Stromanthe lutea.* This has a thick, fleshy rhizome, with high,

smooth, ramified stalk. The country-people use the tea of the leaves in urinary retention; a tincture is official there, made of equal parts of the fresh leaves and 90 per cent. alcohol, and is given in 8–10 drop doses, in catarrh of the bladder.

Arrowroot—Analysis of.—T. Watts gives the results of analysis of the ash of ripe St. Vincent arrowroot. From the figures given it is estimated that a fair crop would remove from the soil about 80 to 90 pounds of potash per acre.—Pharm. Jour. Trans., 1894, 624; from Kew Bull., 84, 360.

MELIACEÆ.

Cocillana.—This is the name of a drug obtained from a species of guarea, reputed to possess expectorant properties. A collective study has been made by Rusby, Coblentz and Wilcox. Only the thicker bark from the trunks and larger branches of the tree is collected. It yields 0.13 per cent. of a white crystalline body, having a peculiar aromatic taste, soluble in ether, chloroform, acetic ether, and glacial acetic acid, but insoluble in alkalies, and when heated with water melts to oily globules which congeal on cooling. The M. P. of the compound, which is apparently a solid hydrocarbon, is 80° C.; above that point it sublimes. It requires further investigation. Traces of alkaloid were indicated by Mayer's reagent and a resin (2.36 per cent.) and fixed oil (2.50 per cent.) were also found, whilst a glucoside is also probably present. The preparations of the bark employed in the clinical investigation were a concentrated tincture, a fluid extract and a syrup. It is claimed that in diseases of the respiratory organs, the drug is superior to apomorphine, preferable to ipecacuanha, and safer than pilocarpine.—Brooklyn Med. Jour., July, 1893.

MONIMIACEÆ.

Piptocalyx moorei, Oliv.—E. M. Holmes describes this plant, which was offered in London as a material for use in brewing.—Pharm. Jour. Trans., 1894, 977.

MUSACEÆ.

Musaceæ of Brazil.—Th. Peckolt describes the following: Ravenala guyanensis Benth., Ravenaia madagascarinesis Sonnerat, an analysis of 1000 Gm. of the arillus freed from seeds contained water, 78.69; fixed oil, 13.84; starch, 60.53; glucose, 5.060; protein substances, 22.30; tannic acid, 0.52; red coloring matter, 60.45; resin acid, 201.330; crystals of cumarin, 0.02; extract, 28.44; ash, 24.050 Gm. The oil is yellowish brown, thick, odorless, and of mild taste; the resin is red, odorless and tasteless. Musa sapientum Roxb. (banana) and M. paradisiaca L., and different species of banana, are described and differentiated. A table of comparison of the analyses of 13 specimens of Musa paradisiaca Linn. and M. sapientum L. of Brazil is given. The following plants are also described: Musa speciosa Ten. and Heliconia bihai Sw.—Pharm. Rund., 1894, 35.

MYRICACEÆ.

Genus Myrica—Notes on the Genus.—G. M. Beringer has collaborated some facts on Myrica gale L., M. cerifera L., and Myrica asplenifolia. The paper contains probably the first published account of the anatomy of the latter plant. The leaf is quite hairy on the lower surface, especially at the midrib and margins. On the upper surface they are fewer in number, but more numerous along the midrib. The midrib is quite prominent on the lower surface of the leaf, and about 2 or 3 lateral veins extend into each lobe, and the anastomosing, while not prominent, can be directly seen. Fig. 44 (see p. 914) illustrates the structure as shown on transverse section through the midrib. The surface is well marked with simple trichomes, many of which are branched, and with glands. The conductive system or fibro-vascular portion of the midrib consists of a broadly wedge-shaped almost semi-circular xylem portion, the wood cells and ducts being arranged in distinct radial rows and subtended by a very narrow cambium layer and a broader sieve portion. A crescent-shaped layer of bast cells extends beyond this, and in addition to this the mechanical system is strengthened by prominent layers of collenchyma cells situated below the epidermis and on either side of the midrib. The palisade and fundamental parenchyma cells are well filled with chlorophyll. The parenchyma toward the lower surface is of a spongy, open character.

The stem, on transverse section, exhibits a thin bark, the outer portion of which easily breaks away. The pith is irregular in shape and somewhat eccentrically located. The pith parenchyma cells possess somewhat thickened walls, marked with distinct pittings. The wood is in numerous narrow wedges, separated by narrow medullary rays extending well into the middle bark. The spring and fall deposits of wood are well marked layers, and the section shown in Fig. 45, made from the stem of a plant collected during the recent warm weather in March, shows that the deposition of the more open spring wood had already commenced. The cambium zone is narrow and is subtended by a rather broad phloem layer containing numerous bast cells. The bast cells are pearly white in color, and are greatly thickened, the stratification being distinct and the cavities almost obliterated. In the parenchyma of the middle bark there are numerous large stone cells, forming almost a complete zone of sclerenchyma. Associated with the parenchyma of the cortex are a number of secretion cells filled with a reddish latex, and the cells of the phelloderm are likewise impregnated with a similar substance. In the Pharmacographia Indica, Part VI., page 357, Hooper calls attention to a remarkable stratum of stone cells existing in the bark of the Himalayan species, Myraga nagi, Thunb. A similar layer existing in M. asplenifolia L., would indicate that this was likely a structural characteristic of the order, and would warrant further investigation of other species.—Amer. Jour. Pharm., 1894, 220.

FIG. 44.

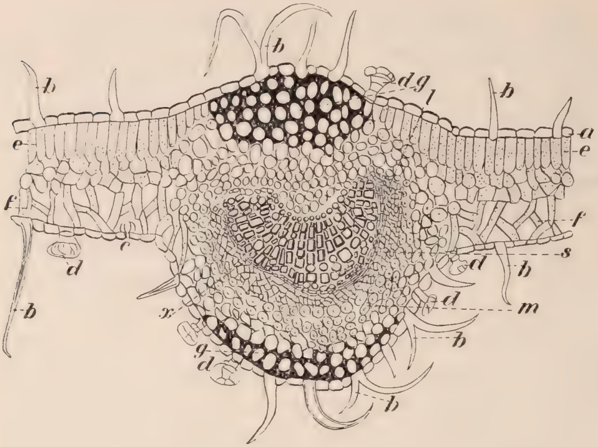


FIG. 47.

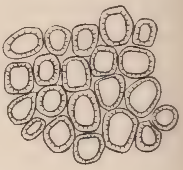


FIG. 45.

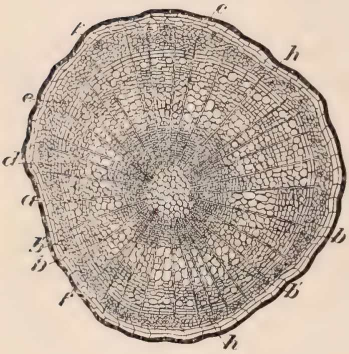
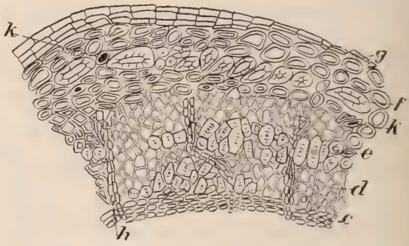


FIG. 46.



EXPLANATION OF PLATE.

Fig. 44. Transverse section through a leaf of *Myrica asplenifolia* L. at the midrib, greatly enlarged. *a*, epidermis. *b*, trichomes. *c*, stomata. *d*, glands. *e*, palisade parenchyma. *f*, spongy parenchyma *g*, collenchyma. *x*, xylem portion. *l*, cambium. *s*, sieve portion. *m*, bast.

Fig. 45. Transverse section of stem of *Myrica asplenifolia* L. × 20. *a*, pith. *b*, xylem, spring growth. *b'*, xylem, fall growth. *c*, cambium. *d*, sieve portion. *e*, bast fibres. *f*, stone cells. *h*, medullary rays.

Fig. 46. Section of cortex, showing sclerenchyma layer. × 50. *c*, cambium. *d*, sieve portion. *e*, bast fibre. *f*, stone cells. *g*, cork. *h*, medullary rays. *k*, secretion cells.

Fig. 47. Pitted pith parenchyma. × 100.

Myrica Asplenifolia.—C. C. Manger has continued the work on this plant done by J. C. Peacock (Proc., 1892, 666). The leaves showed 8.40 per cent., and the rhizome 10.85 per cent. of moisture. The ash of the rhizome equaled 2.27 per cent., and that of the leaves 2.76 per cent.

The petrolic ether, stronger ether and alcoholic extracts were examined. The water-soluble part of the ether extract in the rhizome gave no indications for gallic acid. Potassium cyanide showed evidence of its presence at the same stage in the treatment of the leaves. Glucose and glucosides were both absent here. The water-soluble part of the alcoholic extract of the rhizome contained 5.44 per cent. of tannin and .53 per cent. of glucose; while that of the leaves showed 8.74 per cent. of tannin and .64 per cent. of glucose, and a smaller amount of saccharose. The rhizome yielded with water 6.96 per cent. organic solids, while the leaves yielded 8.44 per cent. The leaves yielded a clear yellowish oil, which after standing two weeks, showed no tendency to become resinous. The oil was specifically lighter than water. When distilled with water the stem furnished traces of oil only, while from the rhizome still less was obtained. The fruit gave a distillate of a very disagreeable odor. Petroleum ether agitated with this distillate removed a small amount of crystalline substance.

With acetone the rhizome yielded a crystalline resin along with some amorphous resinous matter and a granular whitish substance.

The tannin was estimated from the leaves, stem and rhizome collected during different months, and the results are given. No process of extracting and purifying these tannins could be called quantitative. A weak solution of the tannin gave the following reactions. For comparison there are also added the reactions of the tannin of galls and of canaigre.

	TANNINS FROM		
Reagents.	Myrica.	Galls.	Canaigre.
Ferric chloride	dark blue ppt.	dark blue ppt.	green ppt.
and			
Ammon. hydrate	brownish-black ppt.	brown ppt. purple liquid.	brown ppt.
Lead acetate	whitish ppt.	white ppt.	yellowish ppt.
Gelatin	pinkish ppt.	white ppt.	yellow ppt.
Tartar emetic	no change.	white ppt.	no change.
and			
Ammon. chloride.	flocculent ppt.	same unchanged.	flocculent ppt.
Potassium dichromate	yellowish-brown ppt.	brown ppt.	greenish-brown ppt. darkening.
Calcium hydrate	pinkish ppt. darkening.	ppt. darkening.	light pink ppt. turning red and brown.
Bromine water	yellow.	no ppt.	yellow, then brown ppt.
Uranium acetate	brownish-red color.	brownish-red color	crimson color, upon standing a reddish-brown ppt.
Ferric acetate	blue ppt.	blue ppt.	green ppt.

Starch was found in the rhizome but not in the leaves.—Amer. Jour. Pharm., 1894, 211.

Myrica nagi, Thun.—David Hooper describes this bark when collected from large trees, as about half an inch thick, extremely scabrous, pitted from the separation of pieces of suber, of a mottled rusty brown and dirty-white color, suber warty; substance of bark and inner surface of a dull red color; it yields a red color to water; taste strongly astringent. Examined microscopically, within the suberous layer is seen a remarkable stratum of stony cells; the parenchyma throughout is loaded with red coloring matter, and permeated with large lactiferous vessels, from which a gummy latex exudes when the bark is soaked in water.

A sample of Myrica Kino had the following composition:

Pure tannic acid	60.8
Insoluble in water	3.3
Moisture	9.8
Ash	10.8
Sugar, etc	15.3
	100.0

Some of the tannic acid exists in combination with a mineral base. A large quantity of a substance readily reducing Fehling's test, is not a usual constituent of a natural astringent secretion like kino, and he found the above substance had been prepared by evaporating a watery extract of the bark; this would account for the mineral matter and the glucose.

J. Ishikawa (Chem. News, 1880, 275) contributed a paper on materials containing tannin found in Japan, and from a substance named "Shibuki" bark (Myrica rubra) he obtained from 11 to 14 per cent. of tannin. If we may conclude that this tree is the M. rubra, Sieb. et Zucc., then it is synonymous with M. nagi, Thunberg, the very tree under discussion.

A sample of *kaiphal* bark, from Bombay, contained 11 per cent. of moisture and yielded 7.17 per cent. of ash. Estimated in the manner above mentioned for tannin, it afforded 13.7 per cent. The lead compound of the organic acid contained 30.72 per cent. of oxide, a result which compares very closely with the amount found in the compound separated from the "kino," namely, 31.88 and 30.36 per cent. in two estimations. The tannic acid separated from the tincture by evaporation and treatment with water, gives a bluish-purple color with ferric chloride, but on adding this reagent to a decoction of the bark, a dirty green precipitate is formed.

Beyond determining the amount of tannic acid in an authentic specimen of this bark, and obtaining indications of an alkaloidal principle, the author has not had opportunity for further examining the drug. It may on closer research be found to contain interesting crystalline principles, such as those recently separated from its neighboring plants, species of the *Ficus* and *Casuarina*.—Ibid., 209.

MYRISTICACEÆ.

Micro-chemical Determination of Mace.—T. Waage employs a solution of potassium chromate upon a slide containing a section of mace and warms the same. Banda mace remains of an unchanged yellow; Papua mace becomes slightly brown; Bombay mace becomes of a deep red-brown color.—Pharm. Centralh., 1893, 131; Zeitsch. f. Anal. Chem., 1893, 489.

Mace.—In the course of an investigation of a number of samples of mace it was found that the tests relied upon for the detection of adulteration of mace with inferior varieties depending upon the presence and behavior of coloring principles might lead to error, since it was found that with some practice the test revealed small quantities of coloring matter, not only in the genuine Banda mace, but also in the nutmeg. The color tests are best obtained by extracting mace first with petroleum-ether and then with ether; the ethereal solution is evaporated, the residue taken up with alcohol, and the test made with the alcoholic solution. In this connection an observation was made which probably will be of considerable service in deciding upon the question of adulterated mace. The samples were extracted successively with hot petroleum-ether, ether and alcohol; the petroleum-ether extracts, in the cases of Banda mace and nutmeg, represent extract free from volatile oil.

Material.	Petroleum ether Extract.	Ether Extract.	Alcohol (96 per cent.) Extract.
	Per cent.	Per cent.	Per cent.
I. Dark Bombay, whole.........	31.60	30.40	5.90
II. Light Bombay, whole........	34.00	29.50	3.30
III. Mixed Bombay, coarse powder.	30.40	36.70	
I. Dark Banda, selected whole...	19.10	3.49	3.47
II. Light Banda, selected, whole..	23.50	2.50	2.60
III. Commercial Banda, coarse powder..................	24.90	2.86	4.50
IV. Commercial Banda, coarse powder..................	——	2.14	——
V. Commercial Banda, coarse powder..................	——	3.21	——
VI. Commercial Banda, coarse powder..................	——	1.82	——
VII. Commercial Banda, coarse powder..................	——	3.10	
I. Nutmeg....................	31.70	0.60	1.40

The ether extracts are of a resinous nature, soluble in alcohol, and yield the color tests; the ether and alcohol extracts from the Bombay mace are both much deeper in color than those from the Banda mace. It will be noticed that Bombay mace is not distinguished from the Banda mace so much by the difference in fat as it is by the ether extract, after the petroleum ether extraction; Banda mace yielding a maximum of 3.50 per cent., while Bombay mace yields about 30.5 per cent., or ten times as much.—P. Soltsien, Pharm. Ztg., 1893, 467.

Mace and Nutmegs in Bandas.—Statistics in Bull. Pharm., 1894, 40.

Insects Attacking Nutmegs.—J. H. Hart has collected specimens of several species of insects which attack nutmegs whilst being prepared for the market, and amongst them W. H. Blandford has identified the following: 1. Trogosita mauritanica, Linn.; 2. Tribolium ferrugineum, Fabr.; 3. Carpophilus species; 4. Lœmophlœus sp.; 5. Hypothenemus sp.; 6. Lasioderma sp. The second was most common, and the last is possibly L. testaceum, which affects Indian cigars injuriously. The insects appear to have been imported into Trinidad in the corn and linseed meal employed as horse and cattle food. As a preventive the nutmegs are now sprinkled in the drying room, and also when packed for market, with quicklime in powder. A certain means of destroying the insects is to expose the nutmegs in air-tight receptacles to the vapor of carbon disulphide (Trinidad Bot. Dept. Circular Note).—Pharm. Jour. Trans., 1894, 818.

MYRTACEÆ.

Spermoleps Tannifera.—Heckel and Schlagdenhauffen (Rép. Pharm., 1894, 289) urge that the specific name of the plant should be changed so as to accord with the actual facts. When freed from woody matter and heated to 105° C., the exuded product lost 13.598 per cent. of water. It was then treated successively with different solvents, ether dissolving 13.63 per cent.; ether and alcohol, in equal proportion, a further 19.48 per cent.; alcohol alone dissolved 66.42 per cent. of what remained; and the residue from the alcohol (0.47) per cent.), after desiccation, was soluble in water. Chloroform and petroleum ether yielded negative results. After a detailed examination, the composition of the exudation was ascertained to be as follows: Gallo-tannic acid, 79.73 per cent.; tanno-resin, insoluble in boiling water, 19.5; gum, coloring and albuminoid matter, and fixed salts, 0.47; together with 0.3 of a crystalline substance requiring further investigation. This crystalline substance was also found in the wood of the tree, but not in the bark, and is said to resemble catechin, though not identical with it. Both wood and bark contain gallo-tannic acid, but the tanno-resin found in the exudation does not occur in either. It is proposed that the tree should be henceforth known as Spermoleps tannifera.

Jamaica Pimento.—An article on the history, uses and kinds of pimento.—S. Martin in Le Monde Pharmaceut.; reprinted in Nat. Drug., 1893, 169.

Jambul in Diabetes.—Eugenia jambulana is a tree sixty to eighty feet high, indigeneous to all the East Indies. For a long time the seeds and bark have been used in decoction by the natives for diabetes. The fresh juice of the leaves is astringent and has some value in dysentery. The experiments of Graeser were conducted upon dogs rendered artificially diabetic by phloridzin. Both the powdered seeds and an extract from the fruit and bark were used. The reduction in the sugar elimination was marked in all cases. Any unpleasant effects from the drug were rare. In cases of diabetes mellitus in men, the administration of jambul in doses of thirty Gm. a day did not give uniform results, though in each case the symptoms were much relieved. The amount of urine in all cases was diminished, in one case from ten litres to four *per diem.* The hunger and thirst and headache ceased, and the patients gained in weight. The variable effects depended upon the differences in strength of the drugs used. Seeds from jambul of British India were less potent than those from the Java plant. Extracts made from old or dried seeds were not to be relied upon. The active principle has not yet been determined.—Boston M. and S. Journal; Notes on New Rem., 1893, 104.

OLEACEÆ.

Manna Collection in Sicily.—Notes upon a trip to Sicily by J. S. Ward.—Pharm. Jour. Trans., 1893, 381.

Persian Manna.—Manna, or "Gez," as it is locally called, is collected from a shrub found in the districts of Khonsar, Feridan, and Chahar Mahal, in the consular district of Ispahan, Persia. It has been identified as derived from Astragalus anisacanthus. When made up into a sweetmeat, as is done in Ispahan, it has the appearance of flour. It is sent all over Persia, and is much esteemed. The manner of preparation is given.—Chem. and Drug., 1894, 790.

ONAGRACEÆ.

Trapa Bispinosa, L.—D. Hooper.—The Indian water chestnut is used as a food in the season, and considered cooling in bilious affections with diarrhœa. It is a nutritive tonic for invalids and is preferred by some to tapioca and sago. The outer coating is removed and the white kernel is roasted and pounded to a flour.

An analysis of the powdered kernels showed the following composition:

Fat	.97
Sugar and gum	14.36
Albuminous matter	8.41
Starch	63.84
Cellulose	3.60
Ash	4.66
Water	4.16
	100.00
Nitrogen	1.33

The nutrient-ratio, or the ratio between the albuminous matter and the starchy materials, is 1 : 9.5, and the nutrient-value 80.4. This result shows that the Indian water chestnut is allied to the cereals as a food, and is a little better than cleaned rice, which has a nutrient-ratio of 1 : 10.8.

One of the interesting points with regard to the Trapas is the capabilities of these plants for taking up manganese. It is found both in pericarp and kernel.—Pharm. Jour. Trans., 1893, 22.

ORCHIDEÆ.

Cyprepedium Spectabile and C. Pubescens.—On the poisonous influence, by D. T. MacDougal, in Geol. Nat. Hist. Survey, Minn. Bull., 9, part 1, 32, pl. 3.

Vanilla Planifolia.—J. H. Hart, in Bull. Misc. Information, Trinidad Royal Bot. Gard., 240, figs.

Vanilla in Réunion.—Production in this country.—From Consular Report in Pharm. Jour. Trans., 1894, 584.

Vanillas.—A talk on the cultivation of vanillas in Mexico. C. E. Hires. —Amer. Jour. Pharm., 1893, 571–584.

Vanilla Cultivation in Mexico.—Pharm. Jour. Trans., 1893, 266; from the Revista Financiera Mexicana through the Board of Trade Jour. See, also, West. Drug., 1893, 440; Amer. Drug. and Pharm. Rec., 1893, 264; Chem. and Drug., 1893, 388.

Brazilian Vanilla.—Illustration of a bundle from the Amazons.—Chem. and Drug., 1894, 840.

Vanilla in Tahiti.—Statistics and cultivation in Amer. Drug. and Pharm. Rec., 1893, 262.

Varieties of Commercial Vanilla.—Rép. de Pharm., 1894; Drug. Circ., 1894, 155.

PAPAYACEÆ.

Active Principles of the Papayaceæ.—L. Guignard, who has shown that plants in certain families allied to the Cruciferæ, also resemble members of the latter order in containing similar active principles and yielding analogous volatile oils, now shows that the Papayaceæ, which have no botanical affinities with plants in the previously examined orders, yet resemble them as regards their active constituents and properties. Thus, Carica papaya, L., contains the ferment myrosin, and the glucoside potassium myronate, which combine in the presence of water to form the volatile oil, as in the earlier instances. The root is richer in the two principles than the other vegetative organs, the stem being very poor in glucoside. The leaves, however, contain proportionately more of the ferment than the root. From two other species, C. condinamarcensis, Hook fils, and Vasconcellea quercifolia, Saint Hil., the quantity of essential oil obtained was relatively much less than from C. papaya. The organs of the plants poorest in myrosin were found to be richest in latex, containing the vegetable trypsin—papain, but no constituent of the latex takes part in the formation of volatile oil. The myrosin is found in certain parenchymatous cells, and as regards the localization of this ferment the seeds of C. papaya present a curious analogy with certain cruciferous seeds. The glucoside, on the other hand, as in the Capparidaceæ, exists alone in the seed albumen, though associated with a small proportion of ferment in the embryo.—Comp. rend., cxviii., 545.

PAPAVERACEÆ.

Bocconia arborea.—Botanical studies by M. M. Villada.—Naturaleza (Ser. II), ii, 207.

Chelidonium majus.—N. Oslow has devised a new method for isolating chelidoxanthin.—Pharm. Zeitschr. f. Russ., 1893, No. 21; Pharm. Post, 1894, 76. The method is as follows: The acidified watery extract is precipitated with picric acid, and the precipitate is washed with dilute alcohol, and then warmed with ammonia to set free the picric acid. The residue of this is then dissolved in weak hydrochloric acid and precipitated with strong solution of potassium iodide. The resulting compound is washed with cold water, weak ammonia, and ether successively, and then crystallized from alcohol or hot water. The chelidoxanthin obtained by this process forms a dark yellow powder or brownish crystal of bitter taste. By heating, it carbonizes, and a fluid distillate is obtained, a portion, however, subliming unchanged. It is easily soluble in alcohol and weak acids, slightly so in water, and insoluble in ether. It contains nitrogen, and behaves in most respects like an alkaloid. It is certainly not a glucoside. With strong sulphuric acid and vanadic acid it gives a red color, with potassium dichromate it gives a green, and with molybdic acid no color. It occurs in the plant in the proportions of from .005–.01 per cent., and is most abundant when the plant is in bloom; in early spring the plant contains no chelidoxanthin.

China and the Opium Trade.—Viceroy Li Hung Chang. "Opium is a subject in the discussion of which England and China can never meet on common ground. China views the whole subject from a moral standpoint, England from a fiscal. England would sustain a source of revenue in India, while China contends for the lives and prosperity of her people. . . . The present impost duty on opium was established not from choice, but because China submitted to the adverse decision of arms. The war must be considered as China's standing protest against legalizing such a revenue."—Pharm. Jour. Trans., 1893, 520.

Opium Trade of China.—From Consular Report, 1228–1235.—Pharm. Jour. Trans., 1893, 25, 287, 302, 406, 419.

——— (*Macao*).—Ibid., 68 (*Kinkiang*); Ibid., 1894, 966.

Opium Preserving in Wen-Chow.—"The method of collecting the juice in vogue here is for one man to slice with a downward stroke the skin of each capsule, while several other men go round with bamboo scoops to scrape off the juice that exudes. No capsule is sliced twice on the same day, and the largest capsules will only bear six slicings. Moreover, the juice of the first two slicings is far better than that of the later ones. In fact, the wealthier farmers here put aside the juice so collected, and, after drying it (it is not boiled) several days in the sun, store it away in the shells of goose-eggs in some dark place for three years. It is said to be then superior to any Indian drug. Native opium, in any case, should never be used in its first year; at the very least a summer should be allowed to pass."—Chem. and Drug., 1893, 38.

Opium in India.—Notes by W. M., in Brit. and Col. Drug., 1894, 221, on the different forms in which opium is used in India, and the methods of preparing it in the native bazaars.

The Opium Factory of Ghazipore, India.—An account by M. F. Billington, in Madras Times.—Extracts in Brit. and Col. Drug., 1894, 221.

Commerce of Opium at Smyrna.—Brit. and Col. Drug., June, 1894, p. 626.

The Opium Question in Victoria.—Editorial on the prohibition of opium smoking in Victoria.—Chem. and Drug., Dec., 1893, p. 863.

Mitigated or Denarcotized Opium.—Hager recently recommended the following method of preparation: Opium powder is triturated with one and one-half times as much water, and heated to 95–100° C. The water is evaporated, under constant stirring; the residue is dried and preserved, well-stoppered in a dark place. The heating dissipates the narcotine, and thus mitigates the action of the opium.—Pharm. Zeit., 1893, 250.

Sanguinaria Seed—Analysis of.—J. Cully examined the seeds of sanguinaria with the view of ascertaining if the same active principles existed in them as in the rhizome. The following is a summary of the work:

		Per Cent.
Moisture		6.400
Ash		2.600
Extracted by petroleum-ether		28.196
Fixed Oil.		
Alkaloids.		
Extracted by stronger ether		4.474
Resin and alkaloids.		
Extracted by absolute alcohol		2.936
Resin.		
Extracted by distilled water		3.720
Glucose.	.7992	
Sugar	.294	
Mucilage	.6912	

Dextrine	.720	
Undetermined	1.2156	
Extracted by sodium hydrate		9.974
Pectin and albumen	2.856	
Undetermined	7.118	
Extracted by hydrochloric acid		5.360
Calcium oxalate and pararabin	1.45	
Undetermined	3.91	
Extracted by boiling water		1.660
Extracted by chlorine water		.566
Lignin.		
Residue.		32.584
Cellulose.		
Loss		1.530
		100.000

—Amer. Jour. Pharm., 1894, 189.

PIPERACEÆ.

Piperaceæ by C. de Candolle.—Being contributions to the flora of Paraguay edited by M. Micheli.—Basel: George and Co., publishers.

Piperin.—This substance is not tasteless as generally accepted, but by prolonged contact with the tongue develops the sharp taste, which can be better demonstrated by tasting a piperin solution warmed to 50° C.; in the pepper fruit the piperin is dissolved in the essential oil, hence the decreased sharpness of old pepper is explainable by the resinification of the essential oil causing decreased solubility of the piperin. The essential oil has the odor of the fruit, but in alcoholic solution is free from any sharp taste. As an oxidation product of the essential oil, in part at least, is a viscid unsaponifiable oil which also dissolves piperin, but itself is free from odor and taste. In addition to these three constituents, pepper contains cellulose, starch, and small quantities of coloring matter.—Th. Weigle, in Pharm. Ztg., 1893, 584.

Matico.—A False.—H. G. Greenish has examined a broadly ovate leaf sold as Matico, which upon microscopical examination is shown to be a Piper.—Pharm. Jour. Trans., 1893, 383.

PLANTANACEÆ.

Plane-tree Honey.—E. Jandrier describes an exudation found on Platanus orientalis, varying from dry and brilliant to pasty and yellowish appearance. It contains 80 to 90 per cent. mannite and a small quantity of a reducing sugar.—Compt. rend., cxvii., 498.

POLYGALACEÆ.

Adulteration of Senega with White Ipecac.—See Adulteration.

POLYGONACEÆ.

Rhubarb from Southern Russia.—On administration seemed to be inert. It contained 0.8 per cent. chrysophanic acid and 0.25 per cent. emodin.—Mœrbitz, in Phar. Zeitschr. f. Russ., 1893, 241; Pharm. Post., 1893, 333.

Peculiarity of a Species of Rheum.—J. C. Koningsberger (Bot. Zeit., 1893, 85) has examined the root of Rheum macorrhizum, Mart., and found both large and small groups of a small brownish substance existing in the form of grains. These are apparently formed from one of the elements of the wood which is surrounded by an unusual suberized tissue. The origin of the latter appears to be in a row of cells which border near the woody elements. The lumen of the cells is filled with a resin-like substance, which also impregnates and colors the wall brown. On the addition of KOH a purple coloration is obtained, indicating an accumulation of chrysophanic acid. On longitudinal section these cells, containing this coloring matter with their yellowish walls, are apparent with a row of cork cells upon either side. This peculiar formation appears to arise from the abnormal thickening of the walls of the wood bundle. In the lumen of these cells the secretion of this substance commences, which destroys the walls and finally breaks through into other cells.—Apoth. Zeit., 1893, 94.

Rhaponticum.—Spurious rhubarb is largely grown in England, and the belief is expressed that an important branch of the business is in the shipping of this article to American ports.—H. H. Rusby, in Alumni Jour., 1894, 49.

RANUNCULACEÆ.

Aconitum Septentrionale.—This plant closely resembles Aconitum lycoctonum, but the flowers are blue or violet, sometimes white. It grows in Sweden, Norway, Northern Russia, and some parts of Austria. H. V. Rosendahl (Apoth. Zeit., 1894, 112) has obtained from the rhizomes three bases:

Lappaconitine, $C_{34}H_{48}N_2O_8$ in the form of hexagonal prisms, melting at 205° C. A solution of the base in alcohol or ether has a reddish-violet fluorescence. When heated with caustic alkalies, lappaconitine yields two other bases and an acid.

Septentrionaline, $C_{31}H_{48}N_2O_9$, amorphous, melting at 128.9° C., very soluble in alcohol or ether, and in 58 parts of water; has a bitter taste and local anæsthetic action. Alkalies convert it into two other bases and a crystallizable acid, which gives a bluish-violet color with ferric chloride.

Cynoctonine, $C_{36}H_{55}N_2O_{13}$, amorphous, melting at 137° C., readily soluble in water or alcohol, but only in 1373 parts of ether. Mixed with fuming nitric acid and evaporated, the residue becomes blood-red on adding alcoholic solution of caustic potash. Lappaconitine is colored yellowish-red by sulphovanadic acid, afterwards becoming green. Septentrionaline gives a cherry red with furfurol sulphuric acid.

The Alkaloidal Strength of Aconite Tubers.—Hager states that the tubers contain from 0.6 to 1.25 per cent., while Jürgens found only 0.2 per cent. C. C. Keller reports the percentage of five samples as 0.87, 1.14, 1.05, 1.23, and 0.97. The tubers which contained the least alkaloid contained considerable sugar, from which we may conclude that they were not collected from flowering plants. Keller found 0.21 per cent. of alkaloid in aconite leaves.—Chem. Zeit., (Rep.), 1894, 62; from Schweiz. Wochenschrift f. Chemie u. Pharm., 1894, 32, 67.

Hydrastis Canadensis.—J. Pohl considers the morphology and anatomy of hydrastis. The berberine is contained in the rhizome in the parenchyma cells beneath the cork cambium, also in the cortex and in the environs of the vascular bundle. In the powdered condition the rhizome of Jeffersonia diphylla possesses somewhat similar characters to hydrastis. Jeffersonia, however, possesses a ring of sclerenchyma and thick-walled parenchyma cells, and the starch grains are nearly twice as large.—Bibliotheca botanica, 1894, Heft. 29; Chem. Zeit., 1894 (Rep.), 134.

Hydrastis Canadensis.—A contribution to the study of the alkaloids. See Alkaloids.

RHIZOPHOREÆ.

Mangroves in Sierra Leone.—G. F. S. Elliott. The effect of the mangroves in changing any bay or indentation of the coast line into fertile soil is clearly seen at Mahela and the Samu country generally.—Pharm. Jour. Trans., 1893, 26; from Colonial Report.

Cusso Flowers.—Admixture of male flowers with the female flowers.—Pharm. Jour. Trans., 1894, 624.

Adulteration of Cusso with Male Flowers.—E. Hanausek in Pharm. Post, 1894, 94. The male flowers possess the characteristic pollen, the anther possesses a filamentous opening, the cells are small and they are covered with hairs.

Cusso—Adulteration of.—A. Meyer and H. Sandlund have drawn attention to the difficulty that at present exists of procuring kousso in bundles, and point out the fact that an adulteration with male flowers can be more easily effected when the flowers are loose than when the whole inflorescence is packed in hanks. From an examination of commercial loose kousso, they have found that such an adulteration actually takes place to the extent of as much as 12 per cent. These male flowers are unexpanded; the sepals of the outer calyx are distinguished from the corresponding organs of the female flowers by a thick covering of short unicellular hairs. Occasionally the female flowers develop stamens, in which, however, no pollen is formed. The presence therefore of sepals with dense short hairs, of pollen, and of the tissue of the filament in more than very small proportion, are sufficient to distinguish the male flower, either in the loose or powdered kousso.—Pharm. Zeit., 1893, No. 99.

Kosin or Koussin.—M. Leichsenring has re-investigated cusso flowers, and isolated a crystalline inactive body, *protokosin*, and an amorphous, highly active substance, *kosotoxin;* from the latter a yellow crystalline inactive body, apparently identical with commercial kosin, could be obtained by boiling with hot baryta water, purifying and crystallizing. The author concludes that commercial kosin is not a natural constituent of cusso flowers, but is produced from one of the constituents during the process of isolation.—Arch. der. Pharm., 1894, 50.

Rose Growing and Pressing in Saxony.—Kew Bull., August, 1893.

Rose Culture in Bulgaria.—From the World's Fair Circular of Shipkoff & Co., Kizanlik.—Amer. Jour. Pham., 1893, 603.

Otto of Roses in Bulgaria.—Statistics from Consular Rep., 1300; Pharm. Jour. Trans., 1893, 427.

RUBIACEÆ.

Anthocephalus Cadamba (the Kadamba of the Tamils).—The kadamba tree of Ceylon is used by the natives as a medicine (all parts of the tree being employed), as a fuel and for building purposes.—Indian Agric.; Pharm. Jour. Trans., 1893, 308.

Cinchona.—H. H. Rusby, in Alumni Jour., 1894, 49, states that the plant called Cinchona calisaya, var. Josephiana, has been enormously cultivated and distributed to herbaria under the name of Cinchona calisaya. He further says that if the plant were in reality a variety of the species to which it is accredited, the error would be less grave; but it is, in all essential characters, and particularly in its economic aspects, as distinct from Cinchona calisaya as it well could be.

African Cinchona Bark.—In the Kew Bulletin for April, reference is made to the fact that early in the present year a quantity of red cinchona bark, from C. succirubra, was sold at the London sales as "West Coast African bark." It is shown that the bark may be regarded as being derived solely from cultivated trees, grown from seeds or plants originally obtained from South America. The whole of it, moreover, appears to come from the Portuguese island of St. Thomas, and there is no evidence that cinchona is cultivated anywhere on the mainland of the west coast of Africa. A sample of bark grown at St. Thomas, and presented to the Royal Gardens in 1884, was certified as yielding crystallized quinine, 2.64 per cent.; crystallized quinidine, 0.11; crystallized cinchonidine, 0.48; cinchonine, 4.06; amorphous alkaloid, 1.00.—Pharm. Jour. Trans., 1894, 895.

Cinchona Bark—The Position of.—Editorial on the supply for the current year.—Chem. and Drug., 1893, 155.

Cinchona Pioneers.—Chem. and Drug., 1894, 16, 74.

Renewal of Cinchona Bark.—Use of moss.—Drug. Circ., 1893, 213.

Java Government Cinchona Plantations.—Statistics of yield.—Chem. and Drug., 1894, 853; also Pharm. Jour. Trans., 1894, 1087.

Preparations of Cinchona.—Tardy gives processes for obtaining the alkaloid and making the following preparations: Extract, tinctures, syrup of French codex, wine.—Jour. Pharm. Chim., 1894, 447; see also Jandon, Rép. de Pharm., 1893, 484.

Coffee.—According to Heerlein, coffee is neither in itself nutritive, nor does it act as a "sparing" food. It, however, stimulates metabolism, probably by its action on the nervous system. The distillate of coffee smells like coffee, and its chief constituent is caffeole, $C_8H_{10}O_2$.—Chem. and Drug., 1893, 268.

Paramannane.—A lengthy description of this new carbohydrate, extracted from the beans of Caffea arabica, has just appeared, by M. Gilson. It had been shown by the work of Schultze and others that the compounds which constitute the cellular membranes of the coffee bean yielded four different glucoses on hydrolysis—dextrose, galactose, mannose, and a pentose (either arabinose or xylose). These results did not, however, settle the number of separate carbohydrates existing in the plant. Gilson, therefore, set out with the intention of separating these in their original state, without hydrolyzing them. He has succeeded in preparing cellulose and paramannane from the bean in a perfectly pure state, and with crystalline structure. Cellulose, of course, will only yield dextrose by hydrolysis, and paramannane is distinguished by furnishing mannose under this treatment. The beans, in fine powder, are extracted with ether. After the fat is completely taken out the powder is digested several times with 25 per cent. solution of KOH, and then washed with distilled water, and afterward boiled with 2 per cent. H_2SO_4 for five hours. The portion which does not dissolve with acid is treated for an hour with 3 per cent. NH_3 at 60° C., and then washed with water and alcohol, and then dried. The residue is dissolved in Schweizer's solution, and 20 parts of strong solution of ammonia are added. It is then allowed to stand and cool and is poured off from a slight deposit. A current of CO_2 is now passed through the liquid, and the cellulose is precipitated by this, whereas the paramannane remains in solution. This solution is dried on a water-bath, and is treated with a weak solution of hydrochloric acid to remove copper oxide. The solution is now filtered, leaving the carbohydrate on the paper, which is washed with distilled water, and dried. It can be further purified, if necessary, by re-dissolving in Schweizer's solution and repeating this treatment. It is a white, light powder, very much like starch in appearance. Under the microscope it shows a crystalloid structure. It is insoluble in water and alkalies; easily soluble in Schweizer's solution and strong sulphuric acid. On hydrolysis by Flechsig's method it yields a sugar whose hydrazone melts at 185° C. and possesses the other properties of mannose. —Amer. Drug. and Pharm. Rec., 1893, 118.

Ipecacuanhas of English Commerce.—E. M. Holmes directs attention to the varieties and qualities of the drug as met with in commerce, and appends a histological table by which the spurious ipecacuanhas may be detected. He describes the ipecacuanha yielded by the genus Cephælis, and the spurious or Poayas (Psychotria emetica, Richardsonia scabra and Ionidium Ipecacuanha).

The following key to the microscopical structure of the commercial ipecacuanhas may perhaps prove useful to pharmacists. It is based upon a paper on this subject by Tschirch and Ludke in the Archiv. der Pharmacie, 1883, 441. Several of the varieties mentioned by these authors have not been met with in English commerce. On the other hand, some are now added which have appeared in English commerce, but do not seem to occur in their list.

I. Woody column containing chiefly tracheids, but no vessels.

A. *Root bark containing starch and raphides.*

1. Parenchyma of bark uniform = *Rio Ipecacuanha.*

2. Parenchyma of bark forming two layers = *Carthagena Ipecacuanha.*

B. *Root bark containing no starch, but sugar.*

Woody centre, not visibly porous = *Greater Striated Ipecacuanha.*

II. Woody cylinder containing vessels, wood-cells, and medullary rays.

A. *Root bark containing starch.*

1. Medullary rays composed of a single row of cells, woody centre visibly porous = *Lesser Striated Ipecacuanha.*

2. Medullary rays forming two or three rows of cells = *Undulated Ipecacuanha.*

B. *Root bark containing inulin.*

1. Medullary rays of a single row of cells, no starch, sphœraphides in the bark = *White Ipecacuanha* (*a*).

2. Bark contains stone cells.

3. Medullary rays broad = *White Ipecacuanha* (*b*).

III. Rhizome having a monocotyledonous structure, brown pigment cells in parenchyma, acicular raphides and starch present = *False Indian Ipecacuanha.*

It should be remarked, in conclusion, that although it is comparatively easy to identify any of the spurious ipecacuanhas by their microscopical structure and external characters as seen under a good lens, it is by no means so easy to detect the presence of the spurious roots in powder, since in several of them starch and acicular raphides are present, and the starches can only be determined by careful and repeated examinations and measurements. It may be hoped, therefore, that a process for obtaining emetine in a pure state will soon be devised, so that it may be possible to obtain a standard for genuine powder. Until then chemists will do well to purchase ipecacuanha root containing as little stem as possible, and to powder it themselves. In this way only is it possible at present to personally guarantee satisfactory preparations.—Pharm. Jour. Trans., 1893, 209.

Ipecacuanha.—J. Attfield examined two commercial samples and found them to contain but two-thirds only of official (B. P.) ipecacuanha and one-third ipecacuanha stems. They each, however contained 2 per cent. emetine; this is rather high. It is to be hoped that any future authoritatively enjoined "standardization" of ipecacuanha founded on the proportion of emetine will be therapeutically satisfactory, but such a position is not yet attained. We may be said to know nothing, and to be able to infer but little pharmacologically, respecting ipecacuanha stems. Even the estimations of "emetine" in ipecacuanha stems are too few at present to warrant generalization as to the relative proportion of "emetine" in stems as against "emetine" in root.—Pharm. Jour. Trans., 1893, 48.

Ipecacuanha.—H. G. Greenish has examined the "black" or striated ipecacs of commerce microscopically, and finds that they, with the specimens of the Pereira collection, should be referred to Richardsonia and not Psychotria. The wood of Psychotria is dense, while that of Richardsonia and the specimens referred to are porous.—Pharm. Jour. Trans., 1893, 383.

Carthagena Ipecacuauha.—This drug has been offered in London markets mixed with a noticeable quantity of Psychotria root, the center of which is usually soft and moist, purplish in color, and seldom brittle.—Pharm. Jour. Trans., 1894, 624.

——— Carthagena ipecac is supposed to be rigidly excluded from our market, yet it is stated that very direct and definite evidence exists that a regular business exists in London of "picking over the Carthagena ipecac, selecting certain roots, breaking off certain parts of them, when necessary, and staining the suitable portions in imitation of the Rio variety, for the purpose of evading our custom house officers."—H. H. Rusby, in Alumni Jour., 1894, 49.

——— *De-emetinized.*—F. C. J. Bird refers to the conflicting results obtained by different investigators who have endeavored to deprive ipecacuanha of its emetic property, and to Kanthack and Caddy's statements (See Proc. 1893) with regard to the anti-dysenteric effect of the drug when freed from alkaloid. He then summarizes the work done in the direction of removing the emetine without otherwise affecting the action of the drug, and suggests that a satisfactory process consisted in exhausting the finely powdered drug by percolating with ammoniated chloroform, washing out the emetine from the solution with dilute sulphuric acid, returning the washed chloroform to the powder, and, after mixing uniformly, drying the product. It was further stated that it would be useful to ascertain to what extent the chloroformic extract, freed from emetine, possessed anti-dysenteric properties. Little is known of the particular constituent of ipecacuanha to which its anti-dysenteric action is due. Some have attributed it to ipecacuanha-tannic acid, but this supposition admits of considerable doubt. The isolation and identification of the anti-dysenteric principle offers an excellent opportunity for useful and interesting research. —Pharm. Jour. Trans., 1893, 211.

Ipecacuanha—Chemistry of.—B. H. Paul and A. J. Cownley find that the alkaloid emetine is not homogeneous, but a mixture of two or more different substances. They have found an amorphous alkaloid associated with others which are distinctly crystalline and very different from the amorphous alkaloid in physical characters.

The crystalline alkaloid is very much less soluble in ether, chloroform, or benzine than the amorphous alkaloid with which it is associated; but, as is usual in such cases, it is not until separation has been carried to some considerable extent that this difference becomes apparent. The quantity of material disposed of in the operations of fractional crystallization or precipitation, requisite for separating the alkaloids, is so great that very little remains for further examination, unless larger quantities are operated with than they have yet had at their disposal.

The stem of Brazilian ipecacuanha appears to contain a small amount of the same amorphous alkaloid that is present in the root; but it is accompanied by a distinctly crystalline alkaloid. It is very sparingly soluble in ether, but separates from the solution on slow evaporation in lemon-yellow transparent crystals melting above 100° C. When precipitated from the solution of a salt by ammonia, it rapidly assumes a crystalline form, and on addition of caustic soda it is dissolved in the manner stated by Lefort (see supra). It forms a neutral hydrochloride which is amorphous, and the platinum salt appears to be readily decomposed.

This alkaloid is present in very much larger proportion, relatively to the amorphous alkaloid, than it is in the root. Consequently it follows that determinations of the amount of alkaloid, as a whole, in the stem will not correctly express the relations of stem and root in regard to the amount of emetine. Evidently no inference can be drawn from such determinations as to the relative values of those portions of the plant as medicinal agents. Before that can be done with any degree of certainty it will be necessary to find means of separating the alkaloids so that their several amounts may be ascertained, and to do that a knowledge of their characters must be obtained. With that object in view the authors are now engaged in preparing such quantities of the several alkaloids of ipecacuanha as will admit of their chemical characters being studied, so as to furnish data for their separation and identification, besides furnishing material for ascertaining their respective therapeutic effects. Meanwhile, however, it must be pointed out that, apart from the absence of official recognition, there is no ground whatever for the assumption that ipecacuanha stems possess properties which justify the admixture with the roots. So far as anything is known, it points in the opposite direction.

The authors further seem to have obtained evidence that Carthagena ipecacuanha contains, in addition to a considerable amount of amorphous alkaloid, some proportion of another crystallizable alkaloid which presents marked differences from the crystalline alkaloid of Brazilian ipecacuanha.

The striking absence of agreement in the results of different authors in determinations of the alkaloid in ipecacuanha, seems to arise from the want of preserving, throughout the entire treatment, conditions which are suited to the characters of the material operated upon, and of the substance to be obtained from it. So far, the authors are inclined to the conclusion that the percentage amount of alkaloid in ipecacuanha root does not vary very much from 3 per cent.—Pharm. Jour. Trans., 1893, 61.

Carthagena Ipecac.—Kremel (Pharm. Post, 1893, 623) claims it to be derived from Cephaëlis acuminata. It constitutes at least one-fourth of all the ipecacs in the market. Its percentage of emetine is as high as that of the common Rio ipecac, and it is even preferable, since the latter article now appears only in small fragments. The Cephaëlis ipecacuanha differs from the Cephaëlis acuminata, by the circumstance that the cortical parenchyma of the latter consists of two layers (which, however, is not perceptible macroscopically). Holmes has thoroughly studied all the varieties of ipecac now in the market, and found that five of them—the roots of Richardsonia scabra (Violacea), Psychotria emetica, Jonidium ipecacuanha, etc.—contain no emetine at all, and are consequently quite inert. The Indian ipecac possesses, as a rule, only thin root-fibres, but contains more emetine. Holmes warns emphatically against dust-covered ipecac roots; three-fourths of these had been moist and mouldy, and, on drying, a powder formed on the surface. This sophisticated article is for this reason often first washed and then dried, and then appears nearly black and broken in small pieces. This "doctored" ipecac is, of course, absolutely unfit for medicinal purposes.

Ipecacuanha.—J. Moeller observes that Carthagena and Rio ipecacuanha can be distinguished from one another by the difference in the size of the starch grains, those of the former variety being about twice as large as those of the latter, but a marked differentiation of the cortex of the Carthagena root into two layers, as described by Karsten, could not be detected. The "striated" ipecacuanha with dense wood and sugary cortex differs from Carthagena ipecacuanha only in containing sugar instead of starch. Moeller considers that the two roots are probably derived from the same plant; but have been collected at different periods. He compares them to the autumn and spring belladonna roots, and finds confirmation of his supposition in the absence of alkaloid from sugary (spring) root. Moeller has also examined the false Indian ipecacuanha, and contests Kevinney's opinion that it is the rhizome of the Helonias dioica; the latter is a North American plant, and differs in anatomical structure from the Indian root. The latter Moeller considers to be the rhizome of a plant belonging to the natural order Aroideæ.—Pharm. Rundschau, 1894, 104; Pharm. Post, 1894, 165.

Ipecacuanha.—C. Hartwich does not share Moeller's opinion that the false ipecacuanha sugary cortex is derived from the same plant as Carthagena ipecacuanha. The total absence (not simply diminution in quantity) of emetine, the presence of pigment, and the fact that both roots occur in the same package, are objections; moreover, Hartwich has been able to compare it with a specimen of Psychotria emetica, collected by Triana, and finds them identical. In Carthagena ipecacuanha two varieties are, according to Hartwich, to be distinguished; the one contains distinct medullary rays, compound starch grains, with at most four component granules; in the other as many as eight component granules may be counted. The latter variety appears to be the one generally met with.—Zeitschr. Oesterr. Apot. Verein., xxxii., 345.

White Ipecac in Senega—See Adulterations.

Ipecacuanha Root and Stems.—Editorial on Attfields examination.—Chem. and Drug., 1893, 88.

Ipecacuanha.—Editorial, being a review of the recent work.—Alumni Jour., 1894, 60.

Madder Coloring Matters.—E. Schunck and L. Marchlewski have continued their experiments on the constitution of rubiadin.—Jour. Chem. Soc., 1894, 182.

Rubia sikkimensis.—Perkin and Hummel from the root have isolated a red crystalline compound having all the properties of purpurin, another apparently identical with munjistin obtained by Stenhouse from Rubia munjista* (R. cordifolia), and a third substance somewhat resembling purpurin. A yellow mass of crystals was also separated which seemed to be identical with purpuroxanthin. Almost similar results were obtained when "munjeet" was examined on similar lines.—Jour. Chem. Soc., 1893. 1157.

RUTACEÆ.

Aegle marmelos, Correa.—A. Radakow. A clinical and pharmacognostical study.—Pharm. Post, 1894, 120. (Illustrated.)

Ceará Jaborandi.—E. M. Holmes points out that a new kind of jaborandi has been offered and that it resembles the genuine article in several points. The leaflets resemble those of the true Pernambuco jaborandi in their coriaceous or leathery texture and in the dark-green or brownish-green color of the upper surface and in the emarginate apex, but differ in the under surface of the leaf, being covered with short, curved, simple unicellular hairs. On the upper surfaces these hairs are present on the midrib, but are only sparingly visible elsewhere on the upper surface. The margin of the leaf is also strongly incurved. When chewed it does not cause a flow of saliva. According to Paul and Cownley, the leaves do not contain any considerable amount of a base forming a crystallizable nitrate corresponding to the salt of pilocarpine.— Pharm. Jour. Trans., 1894, 1065.

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* [R. cordifolia var. mungistan according to F. and S., En. Pl. Jap. Reporter.]

Pilocarpus microphyllus, Stapt.—T. H. Wardleworth describes a new species of Jaborandi in Pharm. Jour. Trans., 1894, 506. While possessing the general characteristics of jaborandi, the leaves were much smaller and the emargination at the apex was most pronounced. The leaves were received from Maranham, and are described as follows: The leaves are impari-pinnate, petiole narrowly winged, articulate at the junction of the leaflets; leaflets ¾ to 1½ inch long, oblong-ovate or oblong-lanceolate, cuneate at the base, deeply emarginate at the apex, evergreen, margins entire or faintly crenate, slightly revolute. The leaflets are coriaceous and possess numerous pellucid oil glands. Historical examination reveals the same structure as other leaves of jaborandi, but the new variety is almost devoid of the stellate hairs on the under surface. Mr. Conroy examined these leaves chemically, and found an alkaloid possessing all the chemical properties of pilocarpine.

West India Lime.—An account of the plant, yield and exports.—Kew Bull., 1893; Amer. Drug. and Pharm. Rec., 1893, 317, 328.

Lime Tree Juice.—Marquenne finds that when the fresh leaves of the lime tree are treated with water and evaporated on a water-bath to a syrup, about one per cent. of a sweet brown substance is obtained, with a bitter after taste. On treating this with alcohol the solution deposits microscopic crystals which, when pure, are found to be identical with melizitose. The syrup contains glucose as well.—Notes on New Rem., 1894, 82: from Compt. rend., 1894.

Identity Tests for Lemon and Orange Peel.—E. G. Clayton (The Analyst, 19, 134) has noticed that when orange peel is moistened with strong hydrochloric acid, its color changes from yellow to a rich, dark green; lemon rind, similarly treated, retains its hue, or at most, assumes a dingy, yellowish-brown tint. A convenient and simple chemical test, therefore, which will distinguish between small fragments of lemon and orange peel is to touch them with a glass rod previously dipped in hydrochloric acid. The diluted acid will answer the purpose, but the reaction is slower. A few minutes exposure to hydrochloric acid gas will effect this change in the pigment of orange peel. The color of lemon rind is unaffected. The The shades of green developed by dilute hydrochloric acid are deepest in the cases of Mercia, Denia and Florida oranges; of moderate intensity with Jaffa and "blood" oranges; and feeble with Valencia and Tangerine oranges. This statement also applies to the reactions with strong hydrochloric acid, except that the color of Tangerine orange peel with the strong acid is perhaps more intense than that observed with any of the other varieties of the fruit. The peel of the lime behaves, with hydrochloric acid, like lemon rind. Hehner says that it is not at all an infrequent occurrence for lemon and other peels to be artificially colored. He thought that at present too implicit reliance should not be placed on this test in the case of candied peel.

SALICACEÆ.

Salix tetrasperma produces on the leaves at the commencement of the hot season a syrupy exudation, which dries up in thin white flakes to a sugar or manna.—J. G. Prebble, in Pharm. Jour. Trans., 1898, 21.

SANTALACEÆ.

Santalum Praesii—Crystalline Substance from.—A. Berkenheim has investigated a crystalline substance obtained by Schimmel and Co., from Santalum praesii. On recrystallization, it forms large prisms, melting at 101–103° C., and having the composition represented by the formula $C_{15}H_{24}O_2$. On heating with acetic anhydride, it gives an acetate, $C_{15}H_{23}O_2Ac$, which crystallizes in large, hexagonal plates, and melts at 68.5–69.5° C.—Jour. Russ. Chem. Soc., 1893, 688.

SAPINDACEÆ.

Guarana.—H. Thoms has examined the seeds of guarana, and compared the results to guarana paste :

	Seeds of Paullinia.		Guarana Paste.
	I.	II.	III.
Moisture	8.52	8.66	8.63
Ash	1.72	1.74	1,68
Caffeine	2.845	2.750	2.685

—Jour. Pharm. Chim., 1893, 214; from Pharm. Centralh., 1892, 433.

Macassar Oil.—Prepared from the seeds of Schleichera trijuga, N. O. Sapindaceæ. A sample of the true oil received by R. Glenk from Mirzapoor, Hindoostan was at the ordinary temperature, semi-solid and yellowish-white appearance with a weak odor of bitter almonds.

It has a mildly acrid taste, probably due to partial rancidity and an acid reaction to litmus paper. It is completely liquified at (28° C.) and congeals near (10° C.). The oil is readily saponified by sodium hydrate even at a low temperature, the soap being white and hard. With nitrous acid it assumes an orange red color and becomes viscid but does not seem to solidify. On adding 5 drops of the oil to 20 drops of concentrated sulphuric acid, it acquires a reddish brown color. The oil is freely soluble in chloroform, ether, bisulphide of carbon, benzol, benzin and the fixed and volatile oils, but only slightly soluble in alcohol. It has a specific gravity of 0.942. An excellent formula for preparing a so-called macassar oil for the hair and which has given great satisfaction to those who have used it, is the following:

R. Castor oil	16 fl. oz.
Alcohol	3 fl. oz.
Oil of nutmeg	30 ♏.
Oil of rosemary	10 ♏.
Oil of sweet marjoram	10 ♏.
Oil of neroli	10 ♏.
Oil of rose	20 ♏.
Tincture of musk	1 fl. ʒ.
Alkanet	sufficient to color.

Macassar pomade, made by the following formula, also makes an excellent preparation:

R. Castor oil	10 oz. weight.
Suet	2 oz.
Spermaceti	1 oz.
Oil of nutmegs	½ fl. ʒ.
Oil of sweet marjoram	½ fl. ʒ.
Oil of rosemary	½ fl. ʒ.
Oil of rose	15 ♏.
Oil of rose geranium	10 ♏.
Alkanet root	sufficient to color.

Melt the spermaceti and suet adding the castor oil previously colored by digesting with alkanet, and lastly add when nearly cold the perfumes, which in this case are also the medicaments.—Amer. Jour. Pharm., 1893, 529.

SAPOTACEÆ.

Caoutchouc from Mimusops.—Holle (Archiv. der Pharm., 1893, 667) directs attention to the growing importance of the various species of Mimusops as sources of caoutchouc. All the Sapotaceæ yield a milky juice containing caoutchouc, and plants belonging to the natural order are found throughout the whole of the southern hemisphere. He considers the milky juice to be a reserve material capable of being utilized should necessity occur.

Action of Metals on Caoutchouc.—Recent experience concerning the action of metals on caoutchouc shows that that of copper is the most injurious. Platinum, palladium, aluminum and lead act but very feebly. Magnesium, zinc, cadmium, cobalt, nickel, iron, chromium, tin, arsenic, antimony, bismuth, silver and gold have no action. Among the metallic salts, those of copper are most destructive, as are also silver nitrate, manganese binoxide, and a few less known products; while the nitrates of iron, sodium, uranium and ammonium exercise a less marked deleterious influence than the preceding substances.—Il Progresso e Boll. Chim. farm., 1894, 43.

Gutta-Percha.—O. Oesterle (Arch. der Pharm., 1893, 641). Gutta-percha (preferably getah-pertcha) is a collective name applying to the product obtained by the induration of the milk sap of several different trees, of which the one formerly best known, Isonadra gutta (Hooker), or Palaquium gutta, has now almost disappeared, owing to the felling of the trees to obtain the juice, and their consequent destruction. According to Burck, several other species of Palaquium were employed in 1884 as sources of gutta-percha, notably P. borneense, P. trenbii, and P. leerii. A somewhat similar juice is also yielded by other members of the sapotaceous family, but the products thus obtained from Sideroxylon, Chrysophyllum, and Mimusops are of little or no industrial value. The author has examined gutta-percha obtained from P. leerii, and found it practically identical with the ordinary commercial article; it consisted of gutta $(C_{10}H_{16})n$; alban, $C_{14}H_{64}O_2$; and fluavil, $(C_{10}H_{16}O)n$, the latter being present in larger quantity in some specimens than in others, and producing a corresponding deteriorating effect on the physical qualities of the mass; whereas an increased proportion of alban seems to be without this effect.

SCITAMINEÆ.

The Banana Fruit contains cane sugar as the chief carbohydrate, invertase is also present, explaining the various proportions of cane sugar and invert sugar existing in infusions made at different temperatures. At 54–57° C. a five hours' digestion will not only completely invert the saccharose existing in the fruit but considerable additional quantities.—D. F. Mieran, Chem. Ztg., 1893, 1021.

Invertase in Banana.—F. Mierian gives method of determination.—Chem. Zeit., 1893, 1283.

Ginger in Jamaica—Collecting and Curing.—Wm. Fawcett. Being information obtained by a series of letters obtained direct from the source of supply and incorporated in the Bulletin of the Botanical Department, Jamaica.—Reprinted in Amer. Jour. Pharm., 1894, 184.

Discrimination between Genuine and Exhausted Ginger.—B. Dyer and J. F. H. Gilbard recommend taking the alcoholic extract, after first extracting the sample with ether. In genuine gingers it ranges from 2.1 to 3.8 per cent.; in the exhausted samples, from 0.8 to 1.4 per cent. They also attach great value to the constitution of the ash, which, in genuine samples (excluding sand), ranges from 3.1 to 4.1 per cent., whilst in exhausted samples it is only 1.1 to 2.3 per cent. The ash soluble in water is especially important, as, in genuine samples, it ranges from 1.9 to 3 per cent., whilst in exhausted samples it is 0.2 to 0.5 per cent.

The authors, whilst not denying that some samples of ginger may be mixed with a considerable amount of exhausted ginger without fear of detection, still hope that their process will be useful to prove a flagrant adulteration of the drug.—Analyst., 1893, 197.

Grana Paradisi.—A comprehensive article on the history, botanical origin, pharmacognosy and chemistry of grains of paradise.—T. F. Hanausek, in Chem. Zeit., 1893, 1765. (Illustrations of anatomy accompany the paper.)

SIMARUBACEÆ.

Choparro amargosa.—Mixon (Texas Sanitar., II, No. 10) describes Choparro amargosa as a small, thorny bush that grows in Southwest Texas. The bark, leaves, thorns, flowers, and fruit, all have an intensely bitter and characteristic taste. The tendrils contain the active principle in greatest proportion, and are generally selected for pharmaceutic purposes. The plant yields its virtues to boiling water, in the proportion of from 2 to 4 ounces to the gallon [1–2 : 64]. The dose of the fluid extract, as a tonic, is from 10 minims to ½ fluid ounce; as a stimulant, from 3 fluid drams to 1 fluid ounce. Large doses cause flushing of the face, and fulness of the head. The odor of the drug can be detected in the urine, although no appreciable effect upon the renal secretion has been observed. All parts of the bush are said to possess medicinal virtue, except old stock. The drug is credited with some antiperiodic properties, which might make it a desirable remedy in the treatment of malarial dysentery. The active principle, upon which the properties of the drug are supposed to depend, has not yet been isolated.

Unknown Digitalis Species—Experiments with an.—H. Goldenberg. Inaug., Dissert. Univ. Dorpat. The author concludes that all species of digitalis exert the same action on the heart of a frog as the infusion of Digitalis purpurea; but differ considerably in the energy of their action. While Digitalis eriostachys and Digitalis glandulosa are only slightly active, and the action of Digitalis fontanesii is extremely feeble, Digitalis nervosa is 1.5 times, and Digitalis ferruginea even 10 times more active than Digitalis purpurea. The various parts of the plants contain the active principles in varying quantities, the seeds being richest in active constituents; then follow the leaves, the membranes of the seeds and lastly the stems. In the latter a substance predominates (digital-resin or toxiresin), whose action commences by exciting the nerve-centres, and ends by paralyzing the muscles.—Vratch; through Nouv. remèdes, November, 1893, 509.

Pharmacology of Digitalis.—Abstract of the discussion upon digitalin before Acad. Méd. de Belgique.—Jour. Pharm. d'Anvers, May, 1893; Jour. Pharm. Chim., 1893, 23.

Belladonna.—A Study of its History, Action and Uses.—Being a pamphlet of 72 pages containing contributions, translations and abstracts on the history, botany, pharmacognosy, pharmacy and pharmacology of belladonna. Published by Johnson and Johnson, N. Y.

Belladonna—Pharmacognosy of.—H. Kraemer describes the macroscopical and microscopical characters of the root and leaves. He has found in some specimens bast cells, announced by Wiegand and Schrenk, but unnoticed by many later writers,—Amer. Drug. and Pharm. Rec., 1894, 358.

Capsicum.—Capsaicin exists not alone in the placenta, but also in the outer red integuments; these if very carefully and perfectly freed from the inner membranes are found to possess a very pronounced sharp taste. The following percentages of ether extract were obtained: Outer red coating 5.96–6.76 per cent.; entire fruit, 8.4–9.26 per cent.; inner coating, 6.02–6.50 per cent., and seeds, 14.20–14.36 per cent. The above statement corrects one made by A. Meyer, that the sharp principle was only present in the placenta.—V. Vedrödi (Ztschr. f. Nahrungsm. Unters.) Apoth. Ztg., 1893, 626.

Composition of Pepper.—With a view of testing the divergent statements as to the composition of pepper, T. Weigle exhausted pulverized white pepper in an extraction-apparatus, first with ether and then with 90 per cent. alcohol. After the ether was distilled off, the residue had a strong odor of pepper, caused by the ethereal oil present, and yielded piperin and a thick, yellow oil, but no glycerides. The ethereal oil was easily isolated by distilling with steam. The alcoholic extract was mixed with lime, strained, and repeatedly extracted with alcohol; from this solution crystalline piperin was obtained. To free it from adherent thick oil, it was shaken with petroleum ether, which scarcely discolors piperin at all, while the thick oil is readily soluble in it and remains behind on the evaporation of the petroleum ether. The thick, yellow oil was not saponifiable and gave a brown mass with concentrated sulphuric acid; its alcoholic solution did not taste like pepper. Its formula was ascertained to be $C_{10}H_{16}O_4$, so that it may be regarded as an oxidation product of the ethereal oil. Resinous bodies, fatty acids, and glycerides, were not present. The isolated piperin was nearly tasteless and insoluble in cold water; when rubbed up with water and heated a little, the filtered fluid had a strong taste of pepper, and on growing cold deposited the piperin again in crystals—the supernatant fluid becoming tasteless again. Alcoholic solution of piperin has a sharp taste of pepper, which grows still more distinct when the fluid is dropped into water, whereby the piperin separates out with opalescence. The ethereal oil of pepper is a colorless, limpid fluid, which, especially when dissolved in alcohol, reveals a distinct, but not pungent taste of pepper. The thick oil dissolves but little in ether, but readily in alcohol and petroleum-ether. The two last-named solutions smell very little of pepper, and are without its taste. Both the ethereal and the thick oil are solvents for piperin. According to these experiments pepper contains, besides cellulose, starch and a slight amount of pigment: (1) ethereal oil, smelling strongly of pepper, the alcoholic solution of which is without a pungent taste; (2) thick oil, tasteless and nearly odorless; (3) odorless piperin, whose solutions possess the characteristic pepper taste, so that the sharp taste of this spice is thus caused by the piperin. The appearance of the pungent pepper taste requires a solvent, and the ethereal oil seems to be such in the fresh fruit. The weak taste of old pepper is explained by the fact that piperin separates in a crystalline form in consequence of increasing oxidation of the ethereal oil and its decreasing power of solution. A microscopic examination of old pepper reveals, in fact, tiny piperin crystals.—Ibid.

Pepper.—E. Hanáusek (Zeitschr. f. Nahr. u. Hyg., 1893, No. 7) has submitted Tillicherry-, Singapore- and Penang-pepper to a comparative examination. He found that Tillicherry pepper consists of very light-brown hard grains, measuring 4–6 Mm., only one in eighty of which is breakable. It contains but few fruit pedicles, and very little dust and waste; the ash amounts to 3.2 per cent. Singapore pepper forms generally rather hard grains, 4 Mm. in diameter, and of a brown to blackish color, with a tendency to turn gray—the ratio of grains admitting of being crushed being 1 : 60. There are more fruit pedicles, dust and waste, in this sort of pepper; the proportion of ash is about the same as in Tillicherry pepper. In Penang pepper, all possible forms measuring 4–6 Mm., are met with; 1–3 grains of every 10–20 are easily crushable. This pepper is brown to gray, rarely of a black tint; the husk may easily be detached. This kind of pepper likewise contains many fruit- and leaf-pedicles, and much dust and waste; ash, 4.99 per cent. The author concludes that Tillicherry pepper is one of the best kinds of pepper, preferable to Singapore, and hardly inferior to Malabar pepper.

Scopola Carniolica.—E. Schmidt (Apoth. Ztg., 1894, 6) continues the study of scopola roots, and has examined a drug occurring in commerce under the designation radix Scopolæ carniolicæ. The chemical nature of its constituents has not been found essentially different from those formerly obtained from the roots of Scopola atropoides, S. japonica, and S. hladnickiana. He has, however, found in this drug cane sugar, and thinks it may probably be present in other kinds of scopola root.

Solanum rostratum and the Colorado Beetle.—Fr. Hoffman has, by correspondence, received the views of E. A. Schwarz, Wm. Saunders, and James Fletcher, and John M. Coulter.—Pharm. Rund., 1893, 287.

Datura stramonium—Alkaloidal Value of the Various Parts of.—A. R. L. Dohme obtained the following figures from a series of assays of the various parts of the plant Datura stramonium, viz.: leaves, stems, seeds and roots. The parts of the plants were separated while still green, some being cut up and assayed at once undried, the rest, however, were carefully dried, powdered and assayed about a week after they were gathered. The stems, roots and leaves marked "a" and "b" were all taken from the same plants, which, too, were gathered in July, but the seed were older, whose origin was not known. The parts marked "c" were gathered in August, part being assayed in the fresh green state, part being used to determine the amount of moisture in order to be able to compare the percentages in the dry and moist conditions directly, part finally being used for drying, and being then assayed in the form of a dry fine powder. Those parts that were assayed in the green or fresh condition are marked "green" in the table below. The methods of assay used were the methods of Lyons for the determination marked "a," and that of Dragendorff for those marked "b" and "c." Dragendorff's method was modified so as to be used as a gravimetric process, and differed from Lyon's merely in the use of dilute alcohol and tartaric acid in the place of Prollius' fluid. It gave better results than Lyon's. See below:

Part of plant used.	Gravimetric percentage.	Percentage by titration of former.
Leaves of Datura stramonium (*a*)......	0.654	0.214
" " " (*b*)......	0.554	0.231
" " " (*c*)......	1.420	0.231
" " " green (*c*)......	1.420	0.271
Stems " " (*a*)......	0.770	0.306
" " " (*b*)......	1.060	0.358
" " " (*c*)......	0.931	0.436
" " " green (*c*)......	1.000	0.467
Roots " " (*a*)......	0.496	0.138
" " " (*b*)......	0.790	0.173
Seeds " " (*a*)......	0.556	0.248
" " " (*b*)......	0.596	0.289

It would seem from these figures that the stems of Datura stramonium are richer in alkaloid than any other part of the plant. Next in percentage are the seed, then the leaves and finally the roots. It is also evident that some slight loss occurs during the process of drying. A similar investigation of the leaves, stems, roots and seed of the plant Hyoscyamus niger has been made, the plants having been gathered in June and imported from Hungary for that purpose. The result was to show that the stems and seed contained little or no alkaloid while the roots contained 0.017 per cent., which is so small that for all practical purposes it may be regarded as none. The residue in the case of the stems and seed did not neutralise any volumetric acid solution, although there was a slight gravimetric residue, from which it is inferred there is either no alkaloid present or alkaloid which possesses no alkaline reaction. The leaves yielded 0.173 per cent. alkaloids by titration. Schoonbrodt has found that henbane leaves gathered in June yield less than those gathered at other times, and also that seeds gathered in June yield no alkaloid.—Amer. Jour. Pharm., 1893, 479.

Tobacco.—H. B. Cox contributes an article on the history, source, constituents (with a table of results arranged according to per cent. of nicotine, importation, manufacture and English grown tobacco).—Pharm. Jour. Trans., 1894, 591.

Determination of Nicotine in Tobacco.—R. Kissling defends his process against the criticisms of Vedriödi.—Zeitschr. f. Anal. Chem., 1893, 567.

Nicotine in Tobacco.—G. B. De Toni has published the results of histochemical researches on Nicotiana tabacum, and other species of the genus. He finds the alkaloid, $C_{10}H_{14}N_2$, to be located chiefly in the epidermal tissues. It is absent from the seed and the young plant. In the root of the mature plant it occurs in the cortical tissue, and especially in the layer of cells immediately beneath the epidermis. In the branches, leaf-stalk, lamina of the leaf, peduncle, calyx, and corolla, it is almost entirely confined to the epidermal cells, and occurs especially in those at the base of the hairs. It is found also, in smaller quantities, in the anthers and pistil. The mesophyll and assimilating tissue of the leaf gave uniformly negative results. Nicotine does not appear to exercise any protective influence on the tobacco plant, since both the fresh and the dried leaves are devoured by many insects. The author believes its function to be simply excretory; it is a product of the reduction of oxygenous substances. The following are given as the best chemical tests for nicotine: The double iodide of potassium and mercury; iodized iodide of potassium; tannic acid; tetrachloride of platinum; iodized iodic acid; Dragendorff's reagent; trichloride of gold.—Ricerche istochimiche preliminari sulla planta del tabacco, Venezia, 1893; Abstract in Pharm. Jour. Trans.

The Chemistry of Tobacco.—A review of the most recent works by R. Kissling, in Chem. Zeit., 1893, 1121.

Tobacco During Fermentation.—Chemical Changes in.—S. W. Johnson. —Duplicate samples of upper leaves, leaves lower down on the stalks, and best leaves were selected, and in each case one sample was analyzed at once; the other fermented before analysis. In fermenting there was a loss of 9.7, 12.3, and 9.1 per cent. in the upper, lower, and best leaves respectively, chiefly due in the case of the lower leaves to the evaporation of water; but in the case of the upper leaves to loss of dry matter. The best leaves lost about equal amounts of water and dry matter. The loss of nicotine amounted to over one-third in the upper leaves, less than half in the lower leaves, and less than one-sixth in the best leaves. The upper leaves lost over one-seventh of the nitrogen free extract, and one-fifth of the ether extract. The best leaves lost chiefly nitrogenous matters, other than nicotine and nitrogen free extract, including the "gum" of tobacco. —Exper. Stat. Record, 1893, 910; from Conn. State Stat. Rep., 1892.

Toxic Effects of Tobacco.—P. Hall considers that, of the various methods of using tobacco, smoking is beyond question the most noxious, and the use of cigarettes is specially objectionable, since the smoke is often inhaled, and the quality of the tobacco inferior. The local effect upon the throat and nose is largely over-rated, the chief effect being produced on the medullary nerve-centres, Huchard referring on this point to the "irritable heart" of smokers. The latter also points out that this action of tobacco in producing functional cardiac disturbances is not merely due to its effect on the nervous system in general and the pneumogastric in particular, but in great measure to its action on the muscular system in general, and particularly upon the vascular walls. Tobacco, therefore, is not simply a cardiac poison; it is also an arterial poison. It produces disturbances in the nerve-centres, the respiratory apparatus, the kidneys, and the heart, and its effects, when past the physiological limit, are very wide and far-reaching, often falling in some degree on any one or more of the nerves or nerve-centres of special sensation, affections of the visual apparatus being most frequent.—Inter. Med. Mag., iii., 178.

STERCULIACEÆ.

A Substitute for Kola.—These have appeared as fresh Kola nuts from Sierra Leone. They are 4 Cm, long by 3 Cm. thick, of a feeble brown color and covered with a somewhat loose covering. On sectioning there is no spur to the embryo, and the whole body arises from a uniform, upon the outside a bright red mass subsiding in a very fine brownish zone. It is the seed of Pentadesma butyracea, Don.—the Kanya nut. This contains no caffeine. It yields the Kanya butter or Sierra Leone butter. It is extracted with chloroform in a whitish yellow mass which under the microscope is crystalline. It contains 18.35 per cent. oleic acid, and 81.65 per cent. steric acid. Heckel also obtained tannin and phlobaphen and 2.70 per cent. of ask.—Chem. Zeit., 1893, 1209.

Kola Nut.—In Annales de L'Institut Botanico-Geologique Colonial de Marseille, Heckel and Schlagdenhauffen give excellent botanical illustrations, and we find an exhaustive account of kola. From their researches it appears that the false kola nuts, which have occurred in European commerce during the last few years, and differ from the ordinary kola nut in having the cotyledons divided into five or six parts, are the produce of a distinct species, which has been named by Maxime Cornu, Cola ballayi. The seeds have been grown in the Jardin des Plantes at Paris, and the seedlings exhibit such differences of habit and botanical detail, that although the Cola acuminata is a variable plant, there seems every reason to believe that the false kola is a good species, and not merely a variety, as other botanists, who had not seen the plants in cultivation had supposed. An important point in connection with these poly-cotyledonous seeds is that they contain only half the amount of alkaloids present in the seeds of

C. acuminata, and also only half the amount of albuminoids and kola red (kolanine). On the other hand, they contain twice as much fat. Heckel is of opinion that there is no chemical body present in the fresh kola that disappears when the seed is dried, but that it acquires on drying a more unpleasant taste, and it is for this reason that the negroes prefer it in the fresh state. Illustrations of all the false kolas that have appeared in commerce are given, as well as of other seeds, such as those of Pentadesma butyracea and Heritiera littoralis, together with all that is known concerning them.—Pharm. Jour. Trans., 1893, 619.

Extraction of the Useful Substances from Kola.—E. Wilsdorff gives method for obtaining the red and yellow coloring matter, theobromine and caffeine and the essential oil.—Abstract in Jour. Pharm. Chim., 1893, 26; Br. Allemand W., 8382, May and Sept., 1892, after Monit. Scientif., 1893.

Kola Nut.—G. C. Bon (Rep. Scientif., Oct. 21, 1893), reviews the recent researches. The pharmaceutical preparations, wines, extracts, syrups, tinctures, elixirs, etc., are without the properties of the kola powder.—Rép. de Pharm., 1893, 497.

Palatable Kola Powder.—The difficulty which presents itself in the utilization of the kola nut, the fruit of Sterculia acuminata and S. macrocarpa, for food purposes, similar to the cacao bean, is the large quantity of tannic acid present which communicates to it an astringent and unpalatable flavor. Availing himself of the property of tannic acid to absorb oxygen from the air in alkaline solution and from nonastringent bodies, B. Hascloff proposes to treat the partly roasted and pulverized nut with alkalies, and expose the moistened powder to the action of the atmosphere at 30° to 35° C. for several days, whereby the tannic acid is destroyed and an agreeable flavor developed. Cacao may yet find kola a dangerous rival amongst competing beverages.—West. Drug., 1894, 19.

Cacao Beans.—Chemistry of.—H. Beckurts gives method for estimating the fat with table of analyses of 22 commercial product. The m. p. of the fat as well as fatty acid is given of the same. The Köttsdorfer saponification equivalent and Hübl's iodine figure are also given. The theobromine was estimated and method with table of results is appended, and ranges from 0.63 per cent. to 2.20 per cent. Estimations of ash and starch were also undertaken.—Arch. de Pharm., 1893, 687.

Detection of Alkalies in Cacao.—Pure cacao has a small proportion of ash which does not effervesce on the addition of acids. An addition of soda or potassa will be indicated by strong effervescence. The aqueous extract of pure cacao contains about one-third of the total ash of the cacao. If fixed alkalies have been added they will be extracted in the water and raise the percentage of ash contained therein. Pure cacaos contain less than 0.1 per cent. of nitrogen as ammonia. If ammonium carbonate has been used in the manufacture it will be found to contain more than 0.25 per cent. of nitrogen as ammonia. To examine cacao powder for ammonia, ten Gm. are placed in an Erlenmeyer flask of about 800 C.c. capacity, 200 C.c. of water, and a sufficient quantity of burned magnesia added. This mixture is distilled and received in $\frac{N}{100}$ sulphuric acid.—Zeits. f. ang. Chem., 1893.

STYRACEÆ.

Benzoin Investigations.—F. Ludy (Archiv. der Pharm., 1893, 500). The purified esters separated from Sumatra benzoin were found by saponification to contain 32.9 per cent. cinnamic acid; the mixture of alcohols combined with the salicylic acid was made up of 5.2 per cent. benzoresinol and 64.5 per cent. resinotannol. From these figures the proportions of esters would be benzoresinol cinnamate 7.4 per cent. resinotannolcinnamate, 92.6 per cent. Attention is called to Sumatra benzoin as a source of cinnamic acid, allowing 15 per cent. woody impurities and several per cent. for benzoic acid, at least 75 per cent. of the benzoin consist of cinnamates yielding 20–24 per cent. cinnamic acid; the remaining resinotannol, 50–60 per cent. can be easily converted into picric acid by warm concentrated nitric acid; the vanillin present to the extent of 0.1 per cent. can also be profitably extracted. The method suggested for the preparation of cinnamic acid is as follows: The filtered ethereal solution of benzoin is agitated with a dilute solution of soda to remove the free benzoic acid and vanillin; the ether is distilled off and the pure esters saponified by boiling with solution of soda for several hours; after acidifying, the mixture is boiled and filtered, the filtrate, upon cooling, separating the acid which is purified by recrystallization, the resinous mass upon the filter is saponified as often as necessary to ensure complete decomposition of the esters (until the alkaline solution warmed with potassium permanganate ceases to develop the bitter almond odor).

The extraction of benzoic acid from Siam benzoin is effected by repeatedly boiling the benzoin for several hours with fresh portions of solution of soda (this must not be too concentrated) until the resin loses the gummy nature and becomes brittle and pulverulent by acidifying the boiling liquid, filtering and cooling the crude, benzoic acid is obtained and then purified by recrystallization. This method is superior to the older one, in which milk of lime is used for saponifying, because of the greater yield, and the rapidity of the process. Two specimens of Palembang benzoin contained benzoic, but no cinnamic acid; this is remarkable since this variety of benzoin comes from Sumatra. The price of this benzoin is very low, and the manufacture of benzoic acid from it, therefore, suggests itself. Three specimens of Penang benzoin gave varying results: one contained benzoic acid with a very small quantity of cinnamic acid; in the second only cinnamic acid was present, while the third contained chiefly cinnamic acid with a smaller quantity of benzoic acid.

Benzoin.—Analysis by J. Salkind (Dorpat Dissert.), of the Sumatra benzoin with the following results: (1) The benzoic acid occurring in this variety is free, while the cinnamic acid is combined as salts of benzoresinol and resinotannol; (2) styrol is uncombined and present only in small quantity; (3) the chief constituents are the esters of benzoresinol and resinotannol, the latter being in larger quantity; (4) Sumatra benzoin is completely soluble in ether and alcohol; petroleum-ether (B. P. 40° C.), and petroleum-benzin (B. P. 65° C.), dissolve very little; benzol is only a partial solvent; (5) vanillin is present uncombined, and exists in quantity of less than 1 per cent. Siam benzoin gave results as follows: (1) it is sparingly dissolved by petroleum-ether and petroleum-benzin; benzol dissolves about 90 per cent., while ether and alcohol dissolve it completely: (2) the benzoic acid (cinnamic acid was not found) is present in very large part, as the ester of benzoresinol and resinotannol, in small quantity, it is present in the free state; (3) the chief constituents are again the benzoic esters of benzoresinol and resinotannol, the latter predominating; (4) vanillin is present uncombined to the extent of 1.5 per cent.; (5) benzyl-benzoate was not detected.—Jour. Pharm. Chim., 1894, 172, and Pharm. Post, 1893, 330.

——— F. Ludy (Archiv. de Pharm., 1893, 461) examined a sample of Siam benzoin and obtained the following constituents: 0.3 per cent. of an oily, aromatic, neutral liquid, which was proven to be an ester of benzoic acid; the alcohol, possibly cinnamyl or benzyl, owing to the small quantity, was not identified, but was found to give the odor of benzaldehyde when mixed with sodium hydrate and potassium permanganate; 0.15 per cent. vanillin; some free benzoic acid; the greater portion of the benzoin is composed of two esters—the benzoates of benzoresinol, and of siamesinotannol. The benzoresinol, $C_{16}H_{26}O_2$ (of which about 5 per cent. was obtained), is identical with that found in the Sumatra benzoin; it crystallizes especially well from acetone, forming groups of long, white prisms. The second alcohol, siamesinotannol, present to the extent of 57 per cent., has the formula $C_{12}H_{14}O_3$, in other respects it agrees with the resinotannol from the Sumatra benzoin. Siam benzoin is perfectly soluble in ether; if this solution be agitated with a dilute solution of potassium hydrate, the entire liquid will suddenly solidify, forming a jelly-like mass, which, under the microscope, is seen to be a mixture of minute yellow needles and an amorphous mass. The crystals are potassium-benzoresinol, and their ready formation was availed of in the separation of the two alcohols.

TEREBINTHACEÆ.

Cashew Gum.—Peckoldt describes this product of Anacardium occidentale, of Brazil, as occurring in hard, fragile pieces, which are scarcely striped externally, sparingly interspersed with air bubbles, more or less transparent, feebly iridescent, yellowish-brown, uviolar and stalactite-shaped; they can be easily reduced to a whitish-brown powder, which is as soluble in water as acacia. A sample examined contained 12.5 per cent. of moisture and 2.5 per cent. of ash (25 per cent. of this being lime). It dissolved up to 98.6 per cent. and left 1.4 per cent. of cortical substance. The 10 per cent. aqueous solution was neutral, precipitated by absolute alcohol, thickened and faintly colored by potassium silicate, and thickened but not coagulated by borax solution. With copper sulphate solution it formed a dark blue mass, separating on boiling traces of red cuprous oxide, the remaining fluid being of a blackish-brown color. The solution became semifluid with ferric chloride, without, however, coagulating; with ferrous sulphate or with lead subacetate no reaction took place; turbidity arose with mercurous nitrate and a thick, faintly milky fluid resulted after 12 hours. There were found, besides 82.2 per cent. arabin, 0.7 per cent. extractive matter; 0.236 sugar; 0.039 alpha-resin acid; 0.296 beta-resin acid. The two latter resemble those in the bark. These and the brown extractive cause the coloration of the gum. Bassorin (4.8 per cent. of which is said to have been found in cashew gum by Trommsdorff) does not exist in this gum according to Peckolt.—Zeitschr. Oest. Apoth. Ver., 1893, 501.

Pistacia terebinthus, Linn.—The galls on these leaves serve to distinguish them from those of P. vera.—J. G. Prebble, in Pharm. Jour. Trans., 1893, 21.

Structure of Terebinthaceæ.—F. Jadin summarises his researches into the structure and affinities of the Terebinthaceæ in the following conclusions: 1. The stem in this order is always characterized by the development in the liber of secretory canals, which are protected by the fibres of the pericycle; this is the most important distinction. 2. The different genera examined cannot be distinguished by the anatomical characteristics of the stem, though in certain cases the latter are of value when taken in conjunction with the peculiarities of the external morphology (Ex.—Pseudosmodingium, Dobinea, Pseudospondias, Cyrtocarpa, Mauria, Sorindeia, Canarium, Scutinanthe, etc.). 3. The presence or absence of medullary canals ought not to be regarded as an important character. They are always absent in certain genera, in others they may be either absent or present, and in Semecarpus, Anacardium, Mangifera, etc., they are constant. 4. Climate is probably an important factor in determining the development of secretory medullary canals (Ann. des sciences nat., [7] xix., 1).—Pharm. Jour. Trans., 1894, 1008.

TERNSTRŒMIACEÆ.

Exhausted Tea.—Ed. Hanausek, by means of Pullfrich's refractometer has devised a method for determining the value of a sample of tea.—Zeitsch. Oest. Apoth.-Ver.. 1893, 458.

Tannin and Theine in Tea.—Remarks on the constituents of a cupful of tea infusion as it is ordinarily made.—Pharm. Jour. Trans., 1893, 29.

——— Tannin is associated with theine in tea in a proportion depending upon climate and soil. Thus the Indian teas are said to contain the largest proportion of tannin, the Ceylon teas an intermediate amount, and the Chinese the smallest quantity, although the plant is strictly indigenous to China. The injurious effects of the tea are ascribed to tannin, which is known to produce gastric and nervous disturbances. The elimination of tannin and the retention of theine has, thus far, been an unsolved problem. Investigations, recently undertaken in the Lancet laboratory, have elicited, however, the following interesting facts (Lancet, 1893, No. 3644): Whilst Indian tea is richer than the Chinese in respect to tannin, it contains a slightly reduced amount of theine. Practically all the alkaloid is dissolved in 5–15 minutes, whilst in that time there is very little increase in the amount of tannin dissolved; when, on the other hand, the tea is allowed to stand for more than fifteen minutes, the maximum amount of both tannin and theine is approached. Consequently, tea should never be allowed to stand longer than fifteen minutes at most. The proportion of soluble constituents taken up by water depends greatly on the character of the water used. Distilled or softened water dissolves the tannin more rapidly; moderately hard water effects just as rapid a solution of theine as distilled water, whilst the objectionable tannin is not so rapidly dissolved. The theine and tannin together amount to one-fourth of the total extractive matter. The best results are obtained when the tea is powdered immediately before use. The flavor is then exquisite; complete extraction of theine is insured; and, if this infusion is allowed to stand for only 5–7 minutes, a minimum of tannin is dissolved.

Oil from Tea Seed.—The seeds of various Camellia species yields an oil useful for lubricant and other purposes; and of tea-oil proper from C. theifera, two varieties are recognized, the Chinese and Assam oil. Chinese tea-seed oil is of the consistency of olive oil, pale yellow and inodorous, sp. gr. 0.917 to 0.927, insoluble in alcohol. It is edible, very suitable for soap manufacture, and a useful lubricant. Oil of assam tea-seed grown in Java was recently investigated by L. van Itallie, and was found to form about 20 per cent. of the husked seeds. It has an acrid taste, a pale yellow color, very thin consistency, specific gravity .920, and congeals at –12° C. The chief constituents of the oil were palmitic acid (about 19 per cent.), liquefiable fatty acids (oleic and linoleic acid about 72 per cent.), and glycerin (about 8 per cent.), with traces of volatile fatty acids, lecithin and phytosterin. It is therefore not at all unlikely that there may be a future for tea-seed oil in the European markets, but it would appear a better plan to express the oil in Ceylon and India and not send over the seeds; at any rate the seeds should be supplied in a better condition than those shown at the auctions.—Bull. Pharm., 1894, 70.

UMBELLIFERÆ.

Galbanum.—A Conrady (Arch. der Pharm., 1894, 98) finds that, in addition to 0.25 per cent. of free umbelliferone, the resin of galbanum contains no less than 20 per cent. of that principle combined with a resin alcohol, galba-resino-tannol, so as to form an ether. This compound was decomposed by heating in a mixture of 3 parts of sulphuric acid and 5 of water, complete decomposition being very tedious. Caustic potash saponifies the ether, but the umbelliferone is converted simultaneously into umbellic acid. The latter body produces a characteristic green coloration when galbanum resin is boiled with caustic potash and chloroform, whereas the violet coloration with hot alcohol and hydrochloric acid is due to the volatile oil.

Galbanum.—As it now occurs in commerce galbanum differs in certain respects from the galbanum of some years ago; in physical respects the consistency is more like terebinthina, while the odor resembles that of the so-called Levant galbanum. Towards solvents and the strong acids the greatest difference is shown, the strong acids acting upon the gum resin itself, or its alcoholic solutions give only yellowish or brownish colorations instead of the violet colorations procurable according to several pharmacopœias. Petroleum-ether extracts from 23.50–30.50 per cent. resin and volatile oil after heating to 120° C. until constant weight is obtained from 2.5–4.5 per cent. resin is indicated; in previous investigations only 0.5–10 per cent. resin was found. This resin is soluble in sodium hydrate, and upon the addition of acid a substance called galbanic acid separates which later becomes crystalline. The presence of this larger percentage of resin interferes somewhat with the test for terebinthina; the petroleum-ether solution agitated with an aqueous cupric acetate with pure galbanum shows only a pale green color, whereas the presence of 10 per cent. turpentine gives to the petroleum ether solution an intense green color.—E. Hirschsohn, Pharm. Ztschr. f. Russl., 1893, 353; Amer. Jour. Pharm., 1893, 384.

Sumbul Resin.—P. H. Utech obtained 6.1 per cent. of a soft, whitish, translucent resin, which on drying in an air bath at 110° C. yielded a clear, transparent, amber-colored product, having a bitter taste and possessing the aromatic odor of the root. It is completely soluble in chloroform, ether, carbon disulphide, acetone, benzol and acetic ether. For other tests see Amer. Jour. Pharm., 1893, 465. Its identity with di-acid phenols could not be established.

URTICACEÆ.

Dorstenia contrayerva—Active Principles of.—U. Mussi has recently investigated this plant and publishes (Ref. Med., 1893) the following results: (1) The aqueous infusion is acid and strongly reduces Fehling's solution; it foams strongly on being shaken, becomes turbid on the addition of alcohol and clear again on the addition of nitric acid. The plant yields about 3 per cent. of ash. (2) An alcoholic extract of the root yields, by suitable treatment, two substances called provisionally cajapine and contrayerbine. The first is a dark yellowish-red amorphous substance, soluble in water, alcohol and ether. It leaves no residue on ignition; its vapors have an acid reaction; its solution does not reduce Fehling's solution; the addition of an alkali produces a yellow-blue fluorescence. It gives precipitates with lead acetate, silver nitrate, ferric chloride, gold or platinum chloride, bromine water, tannic and phosphomolybdic acids. It is unaffected by picric acid, and apparently unaltered by the mineral acids. Contrayerbine is white and amorphous, burns without residue, is soluble in alcohol and ether, but not in water. By treatment with tartaric acid, in alcoholic solutions, it forms a tartrate which is soluble in water. Its solutions give precipitates with gold or platinum chlorides, with Bouchardat's reagent, bromine water, picric acid, or phosphomolybdic acid; but it yields no precipitate with tannic acid. The physiological action of the new substances is being studied by Coronedi.—L'Orosi, 1894, 259.

Constituents of Hops.—Briant and Meacham point out that hops owe their preservative power, according to Hayduck, Trans. Inst. Brew., vi, 149, to three resins they contain: α-resin, precipitated by lead acetate; β-resin, non-precipitable by the same agent; and δ-resin, harder than β, while soluble in petroleum ether, which does not affect any of the others. A distinct antiseptic influence, especially upon lactic fermentation, is possessed by α, but it has no effect upon the acetic ferment and sarcina (Pediococcus cerevisiæ), all the resins are bitter, δ less so than the others, while α dissolves most readily. The constitution of the tannin of hops is said to be not yet understood, and there are believed to be several tannins present. The practical preservative power of hops is not always found to coincide with the proportion of tannin present. In hop oil various observers claim to have found a terpene-like body, an oxygenated hydrocarbon, valeric anhydride, which sometimes oxydizes to valerianic acid and imparts a peculiar cheesy odor to old hops, and cholin, a substance found also in brain and nerve matter. Little is known of the nitrogenous matters in hops, but the presence of small quantities of asparagine has been demonstrated. A fermentable sugar and diastase have also been shown to be present.

Indian Hemp.—Effects of the consumption of "ganja" in India.—Pharm. Jour. Trans., 1893, 26, 127.

The Hemp-Drugs Commission.—Report of a commission appointed by the viceroy of India, to inquire into the cultivation of the hemp-plant in India, the preparation of drugs, the moral effect of their consumption and the desirability of controlling the cultivation of hemp and the manufacture, sale and taxation of haschisch, blang, ganja and similar products.—Chem. and Drug., 1894, 253.

Preparations of Haschisch.—Ibid., 38.

Haschisch in Egypt.—W. C. Mackensie.—Ibid., 1893, 183; Pacific Drug., 1894, 94.

Haschisch Constituents.—Courtive isolated from the hemp a brown acrid resin—the cannabine, identical with that subsequently discovered by Gastinel under the name of haschischine. It is insoluble in water and the alkalies, soluble in alcohol, ether and the oils. Anyone, moreover, can obtain from the Indian hemp by distillation a light odoriferous oil, the vapors of which when inhaled cause giddiness. It contains a slightly crystallizable acid and a hydrocarbon, connalene. Richter in turn isolated another substance from the hemp, the cannabienne; Hay obtained an alkaloid from it, the tetano-cannabine, very similar to strychnine in its physiological action. Finally, Preobroschensky obtained from the haschisch a notable proportion of nicotine, which may be explained more readily than the author may have supposed, for it often happens that the haschisch in powder, intended for smoking, is here selling mixed with powdered tobacco. All these substances, one after another, have passed for the essential active principle of haschisch. The haschischine and the essence have yielded in the experiments most of the physiological effects of the drug.—Revue de Thérapeutique; Bull. Pharm., 1893, 427.

Mururé Juice.—This juice is stated by Chernowitz to be extracted from the incised bark of Bichetea officinalis. It is an alterative and antirheumatic, and is known also as "Vegetable Mercury." It is a thick, muddy, reddish, sweetish acid fluid, sp. gr. 1,100, has a vinous odor, and is said to contain an alkaloid. The juice is extensively employed in Brazil in grave cases of syphilis, and in rheumatism. The dose is 1 fl. dr. in water, once every other day. It is drastic when employed in large doses.—Chem. and Drug., 1893, 491; see also Pharm. Era, 1894, 499.

VALERIANACEÆ.

Valeriana Officinalis.—(Mexican Valerian).—R. McLaughlin obtained a larger amount of a crystalline glucoside from this plant than from the European market variety. The following is a summary of his analysis:

Volatile oil	3.33
Oleoresin	4.30
Wax and fat	1.09
Valerianic acid	0.91
Mucilage	4.50
Pectin	1.35
Undetermined extractive	22.80
Pararabin	1.15
Lignin	9.68
Cellulin	30.84
Loss	1.70
Moisture	11.65
Ash	6.70
	100.00

—Am. Jour. Pharm., 1893, 329.

VITACEÆ.

Vitis vinifera, L.—An account from a historical botanical work by P. R. Stolzissi.—Pharm. Post, 1893, 529, etc.

Vitis sessilifolia, Baker.—Th. Peckolt has examined the tuburculous root-stocks chemically.—Zeitschr. Oest. Apoth. Ver., 1893, 830.

ZINGIBERACEÆ (see also SCITAMINEÆ).

Zingiberaceæ of Brazil.—T. Peckolt describes the following:

(1) *Hedychium coronarium.* The oil (ethereal) with sulphuric acid turns at once reddish brown, yields in 24 hours a dark brown, soft resinous mass. With nitric acid, on heating, it yields a deep yellow color and a penetrating aromatic odor. 100 parts of fresh roots yielded, water, 82; starch, 6.039; glucose, 0.833; fatty oil, 0.06; soft resin, 0.912; resin acid, 0.666; resin, 0.166; extract, etc., 2.666; ash, 1. The fatty oil is yellowish, of strong aromatic odor and pungent taste. Soft resin is bright brown, of turpentine consistency, and a faintly aromatic after taste. It burns with a bright flame an aromatic smell when heated without residue. Sulphuric acid stains it dark brown and then violet. It is soluble in petroleum ether, ether and amylic acid, insoluble in cold alcohol, soluble in boiling alcohol, but separating again on cooling. The brown resin alcohol is solid, without odor or taste; it burns with a bright flame and traces of oil. It dissolves in sulphuric acid with a dark brown color, but is precipitated again by water in brown flakes. The resin is solid, brown, odorless and tasteless. It burns with a bright flame and a weak aromatic smell without residue. It is soluble in benzene, chloroform, glacial acetic acid, amylic alcohol and absolute alcohol. The decoction of root bulbs (1 in 5) is a popular remedy in rheumatism—a tablespoonful several times daily.

(2) *Alpinia nutans.* Seeds round, of pungent, cardamon-like taste. Crushed they serve as spice; they are also taken (with water or wine) in colic. The bulbous aromatic rhizome serves in decoction (1 in 5) taken without residue. Sulphuric acid stains it blackish, while the acid turns golden yellow. It is soluble only in petroleum-ether, ether, chloroform, benzene, and absolute alcohol. The indifferent resin is dark brown, odorless and tasteless, and burns with a bright flame and weak, tar-like smell, without residue; soluble in petroleum-ether, chloroform, ether, benzene, and boiling amylic alcohol (from which it separates again on cooling). The light brown resin acid is pulverizable, odorless and tasteless, and burns with a dull flame, leaving ash. It dissolves in sulphuric acid with a dark brown color; brown flakes are precipitated by the addition of water. It is soluble in chloroform, alcohol, ammonia, and caustic alkalies. The ethereal oil is a yellowish-brown, thin liquid, of a sp. gr. of 0.933, and a somewhat camphor-like, aromatic taste. The fruit is gathered for medicinal purposes as long as it is still of red color. Its fleshy capsular rim is of a beautiful carmine-red, when still fresh, but blackish, when dry; it is

brilliant white internally, of an aromatic odor and a pungent, faintly cardamom-like taste. There were found, in 100 parts of fresh capsule, freed from seed: water and ethereal oil, 93.14; resin, 0.123; albuminoids, 0.221; tannic acid, 0.112; extractive, 0.864; ash, 1.78. The resin is of soft consistency, light brown, of a weak aromatic odor and a very pungent bitter taste. It burns with brisk flame, without residue, and turns purple-red with sulphuric acid. The ash contains about 29 per cent. of sodium chloride. The seeds are angular, rounded off at one side, with a light-brown wrinkled husk of an aromatic, cardamom-like taste. In 100 parts of fresh seed Peckolt found the following: water, 88.600; ethereal oil, 2.564; fatty acid, 0.421; extractive matter, etc., 3.000; ash, 0.914. The ethereal oil is similar to cardamom oil in color, odor and taste; specific gravity, 0.928. The crystalline fatty acid is whitish, of an aromatic odor and a bitter taste. The seeds are considered a specific in helminthiasis. With children, two seeds are counted for each year of age; they are crushed, infused with 100 Gm. [3¼ fl. oz.] of boiling water, strained after a few hours, and taken for five consecutive days. The infusion has an agreeable, aromatic taste; children take it readily with sugar. In ascarides, enemas are employed. The author uses the tincture (1 part of fresh seed to 4 of alcohol), in doses of 1–2 drops for every year, three times daily. The capsule, freed from seeds, is often used as an aromatic and tonic. However, the rhizome is the part of the plant most frequently used. As a tonic and carminative, a tumblerfull of an infusion (1 in 15) is given every two hours; the tincture, in doses of 2–5 Gm.; the powdered dry rhizome, in doses of 0.5–2 Gm. In amenorrhœa, an infusion of 1 part in 10 colature is given in tablespoonful doses every 1–2 hours; in whooping-cough, two-hourly a teaspoonful of a 1 in 8 infusion; and in rheumatism, a cupful of a 12 per cent. infusion several times daily. The rhizome and the fleshy root-fibres, crushed into a mass, are used as a dressing in carcinomatous ulcers; and the decoction of the same is used for irrigations and lotions in purulent wounds.

(3) *Costus spiralis.* The Indians chew the stem of this plant during fatiguing marches and in case of drought. The decoction of the stems and leaves (6 in 40 colature), several cupfuls a day, serves as a refrigerant and diuretic beverage.

(4) *Costus discoloris.* The expressed juice of this plant is viscid, and of an acrid taste; it serves as a remedy in gonorrhœa, and in decoction, as a beverage in gravel and kidney diseases.

Histology of Zingiberaceæ.—J. Barthelot, from his work, draws the following conclusions: There exists a great analogy in structure between the plants of this natural order. The sclerotic arc encircling the vascular bundles is constant in all organs except in the rhizome where it is occasionally wanting. The rhizomes, with few exceptions, contain large quantities of starch. The cells secreting essential oil vary considerably in number, are always distributed singly in the parenchyma tissue, the cell walls not containing suberine, as has been stated by several authors. In all organs tannin bearing cells are found varying in number and shape. The thesis is accompanied by four excellently executed photogravures of longitudinal and transverse sections of Zingiber officinalis, Costus villosis, Curcuma longa and C. xedoaria, Hedychium gardnerianum, Alpinia galanga and Curcuma leucorrhiza.

Tannin Cells of Zingiberaceæ.—The same author has found that two distinct types of the cells of the Zingiberaceæ secrete tannin. Thus, in the species Alpinia galanga and Hedychium gardnerianum, the tannin-bearing cells are not specially localized, being simply parenchymatous cells. In the rhizome of Zingiber officinale, however, three or four tannin cells are found situated near each large vessel. They are polygonal in shape, extend longitudinally, and embrace the walls of the vessels in an irregular fashion. In the stem the cells are larger, but situated near the fibro-vascular bundles; in the leaves they are frequently absent, but, if present, are scattered throughout the parenchyma. They are very numerous in the root, where they exist exclusively in the cortical parenchyma, do not differ in form from the surrounding elements, and are always found near the endodermis. In the Alpinia calcarata, which are particularly rich in tannin, both systems of the tannin-bearing cells are found; but, on the other hand, they are said to be wanting entirely in several species of the genus Curcuma.—Thesis. Lons-le- Saunier, Lucien Declume, 1893.

ZYGOPHYLLACEÆ.

Guaiacum Constituents.—E. Lücker (Pharm. Centralh., 1893) says that guaiacum consists principally of three acids, guaiacic, guaiaconic and guaiacinic, but contains also small amounts of undetermined substances. Besides these bodies which are soluble in alcohol, and make up 75 to 98 per cent. of the crude resin, there is a residue, composed of wood and cork elements, mucilage, an amorphous acid, not yet investigated, inorganic salts, and, finally, a nitrogenous body, exhibiting all the reactions of an alkaloid. Guaiacum has furnished successive inquirers with a subject of study for nearly a century. In 1825 it was regarded as a mixture of weak acids; later, a glucoside was supposed to be present in the drug, but this opinion appears to be unfounded. More important results in this direction have been obtained by a number of recent investigators, who have examined the products of the dry distillation of guaiacum, and, furthermore, have isolated its constituent acids. From distillation have resulted the following: tiglin-aldehyde, guaiacol, creosol and pyroguaiacin. Tiglin-aldehyde is a pale yellowish fluid of a nauseating odor. It boils at 118° C., and possesses the strongly-marked characteristics of an aldehyde. Its chemical structure is that of a dimethylacrolein. Guaiacol, like its homologue creosol, is a methyl ether of pyrocatechin and homopyrocatechin. Pyroguaiacin is a readily crystallizable substance, whose melting point is

180° C. It sublimes without decomposing, and yields on dry distillation a hydrocarbon ($C_{12}H_{12}$) which may possibly be a dimethylnaphthalin.

Two different formulæ have been proposed for pyroguaiacin. Its actual composition is still undiscovered. Guaiacic acid may be obtained from a mixture of glacial acetic acid and water. It occurs in crystals of considerable size, and has a melting point of 70° C. According to Hlasiwetz, its production depends on the difficult solubility of guaiacate of potassium in strong alcohol. Tincture of guaiacum of syrupy consistence is mixed in a certain proportion with a strong solution of potassium hydrate in alcohol. Being completely insoluble in alkaline carbonates, it is inferred to contain hydroxyls only. From its elementary analysis, Lucker deduces as its formula $C_{20}H_{24}O_4$. Guaiacic acid turns red when dissolved in strong sulphuric acid. Generally speaking, in fact, it is very readily oxidized, but does not acquire the colorations characteristic of such action, on which account guaiacum finds application as a reagent in many processes of analytical chemistry. Guaiaconic acid is an amorphous body. The method of producing it is based on its very difficult solubility in ether. The formula of guaiaconic acid is $C_{20}H_{24}O_5$. It melts at 73° to 76° C. Besides the above characteristics, this acid is distinguished by its solubility in alkaline carbonates. Lucker was obliged to boil it with anhydrous acetic acid in order to obtain the combination $C_{20}H_{22}O_5(C_2H_3O)_2$, whose melting point is 61° to 63° C. Guaiacinic acid has not hitherto been obtained without an admixture of nitrogen. Its formula with due allowances may be expressed as $C_{19}H_{20}O_6$. This acid is soluble in the alkaline carbonates, and hence must be regarded as a carbon acid. The author concludes from his experiments that the acids of guaiacum stand to each other in close chemical relation. Both guaiacic and guaiaconic acids contain either one or two hydroxyls. The carboxyl group is present in guaiacinic acid. All these bodies are probably condensation-products from tiglin-aldhyde and guaiacol (or creosol).

MATERIA MEDICA (ANIMAL).

Animal Oils and Fats used in Pharmacy.—P. L. Simmonds writes upon the following: Lanolin, Marine Oils (Cramp-fish, Dolphin, Losh and Pirarucu), Bird Oils (Father Labat, Mother Carey's Chickens, Passenger Pigeons of N. A., Emu, Fulmar, Guncharo, Mutton Bird and Ostrich Fat), Reptile Oils (Alligator, Indian Crocodile, Sucurigu and Turtle), Insect Oils (Oil Beetle, Locusts, White Ants, Earthworms).—Bull. Pharm., 1893, 297.

——— P. L. Simmonds.—Alpaca Tallow, Anata Oil, Axonge, Beef Marrow, Bear's Grease, Castoreum Oil, Glycerin.—Ibid., 344.

Vegetable Oils in Animal Fats—Determination of.—Welmans (Moniteur Scientifique) proposes the following process: Dissolve 1 Gm. of the suspected fat in 5 Gm. chloroform, and to the solution add 2 C.c. of a solution of phospho-molybdic acid, or of sodium phospho-molybdate acidified, a few drops of nitric acid, and agitate the mixture. If the material be pure animal fat, the mixture takes on a yellow color, which disappears on the addition of an alkali or ammonia. If, on the contrary, there be present any vegetable oil, the phospho-molybdic acid is reduced, producing an emerald-green coloration, which passes into blue on the addition of ammonia. Codliver oil is the only known animal oil which gives the same reaction, under these circumstances, as vegetable oils. Vegetable oils which have been chemically bleached do not yield this phospho-molybdic reaction, or react but very feebly.—Nat. Drug., 1893, 112.

Amber.—Statistics from Consular Rep., 1299; Pharm. Jour. Trans., 1893, 404.

Analysis of Bees-Wax.—The method proposed by Hübl, whilst rapid and giving constant results [free acid equivalent 19–21, compound ether equivalent 73–76, saponification equivalent (the sum of the previous two) 92–97, ratio of free acid to compound ether; 3.60–3.80; the first three figures indicate the number of milligrams of KOH necessary for one gram of wax] is subject to the objection that the adulteration may be made with a mixture itself yielding the previous figures, and which can therefore be added to wax in any proportion (such a mixture contains 35 parts stearic acid, 165 parts Japan wax and 300 parts ceresin-paraffin; it is possible for such a mixture to show the normal melting point and specific gravity of wax.) In the analysis of wax it is therefore imperative to embody certain qualitative tests, and to perform Hübl's determinations with wax melted under hot water and repeatedly washed to remove any acid which in the case of white wax especially could be introduced in the process of bleaching). The following are the qualitative tests: (1) Stearic acid. One Gm. is boiled for several minutes with 10 C.c. 80 per cent. alcohol, allowed to cool to 18–20° C., filtered and the filtrate diluted with water; the stearic acid separates in flakes and collects at the surface, while the liquid becomes transparent; the test is sensitive to one per cent.; if 7–8 per cent. are present, the acid remains suspended in the liquid forming a thick creamy mixture. (2) Resin. 5 Gm. wax with 4–5 volumes of nitric acid sp. gr. 1.32–1.33 are kept at the boiling point for one minute, diluted with an equal volume of water and then made slightly alkaline with ammonia; the solution decanted from the separated wax in the absence of resin has a yellow color, whilst its presence causes a more or less intense red-brown color; one per cent. resin can be detected especially if a test with pure wax be made at the same time. (3) Glycerides (Japan wax and tallow) are tested for by evaporating the alcohol from the solution left after completing the Hübl's determinations, adding water, filtering, concentrating the filtrate and heating the residue with potassium bisulphate; the irritating odor of acrolein indicating glycerin and indirectly glycerides. (4) Negative results with 1, 2 and 3, and normal figures, according to Hübl, exclude the presence of ceresin and paraffin, and positively indicate a pure wax. To obtain the proper Hübl's figures in a wax adulterated with Japan wax or tallow, paraffin or ceresin would have to be added along with stearic acid or rosin; if adulterated with carnauba wax, stearic acid or resin must be added. In the analysis of white wax bleached with chemicals, the acid equivalent may run as high as 24; this is the only deviation from the standard figures, and is allowable, providing no stearic acid or resin is detected.—George Buchner, Chem. Zeit., 1893, 918.

Beeswax—Commercial.—E. J. Parry and P. A. Estcourt examined 12 samples from various sources, with the following results:

Number.	Description.	Melting Point.	Specific Gravity at 15.5° C.	Specific Gravity at 99° C.	Percentage of KOH for acids.	Percentage of KOH for ethers.	Total Percentage of KOH.	Calculated for Cerotic Acid.	Calculated for Myricin.	Approximate Percentage of Beeswax.	Adulterants.
1	Pure unbleached beeswax	72°	.9800	—	8.98	4.0	12.98	65.7	48.3	56	Resin.
2	Pure bleached beeswax	64°	.9620	—	2.3	7.43	9.76	16.8	89.6	100	—
3	Pure bleached beeswax	60°	.9500	—	2.7	6.0	8.7	19.9	72.4	84	Paraffin and stearic acid.
4	Pure unbleached beeswax	64°	.9629	.8190	1.96	7.29	9.36	14.4	88.0	100	—
5	Pure unbleached beeswax	57°	.9240	.7920	2.18	2.07	4.25	15.9	25.2	30	Paraffin and stearic acid.
6	Pure unbleached beeswax	57°	.9180	.7857	1.53	4.70	6.23	11.2	56.7	66	Paraffin and stearic acid.
7	Pure unbleached beeswax	64°	.9620	.8185	1.96	7.0	9.07	14.4	84.5	100	—
8	Pure bleached beeswax	62.5°	.9630	.8180	2.4	7.1	9.50	17.5	85.7	100	—
9	Pure bleached beeswax	59°	.9660	—	1.25	6.6	7.85	9.2	79.7	—	Paraffin.
10	Pure bleached beeswax	51.5°	.9393	—	0.61	2.46	3.07	4.5	29.7	35	Paraffin.
11	Pure unbleached beeswax	59°	.9451	—	2.37	6.22	8.59	17.4	75.0	88	Paraffin and stearic acid.
12	Pure unbleached beeswax	61.5°	.9346	—	1.29	3.06	4.35	9.4	37.0	44	Paraffin and stearic acid.

Considering the large extent to which even the best druggists are supplying adulterated wax, they think that the B. P. might well give some fuller and more decisive tests.—Pharm. Jour. Trans., 1893, 189.

In the discussion which followed the reading of this paper at the B. Pharm. Conference, opinions were expressed that the adulterations referred to were not in all cases intentional, and that genuine beeswax could always be obtained if a proper price were paid for it, whilst foreign wax was as good as English for pharmaceutical purposes.

Beeswax—Examination of.—L. F. Kebler has examined sixteen samples, of which eight were pure and eight adulterated.

Serial Number.	Melting Point.	Specific Gravity at 15° C.	Acid Number.	Ether Number	Total.	Ratio.	Cerotic Acid.	Myricin.	Total.	Ratio.	Iodine Number.	Adulterants.	Description.
1	64.41	.9600	20.30	74.20	94.50	3.650	14.86	89.57	104.43	6.028	8.35	—	Pure Yellow Wax.
2	62.81	.9608	29.40	70.00	99.40	2.418	21.52	84.50	106.02	3.92	9.31	Stearic Acid	" "
3	63.20	.9602	18.20	65.80	84.00	3.614	13.32	89.57	102.89	6.731	8.50	—	" "
4	63.80	.9624	20.30	77.00	97.30	3.788	14.86	92.95	107.81	6.547	8.71	—	" "
5	54.42	.9120	14.70	45.59	60.29	3.101	10.76	45.63	56.39	4.240	5.63	Paraffin.	" "
6	63.81	.9641	19.60	75.60	95.20	3.857	14.35	91.26	105.61	6.352	7.26	—	—
7	63.43	.9630	20.10	74.10	94.30	3.681	14.85	89.57	104.42	6.028	6.80	—	Pure Bleached Wax.
8	64.44	.9710	20.30	77.00	97.30	3.788	14.86	92.95	107.81	6.193	6.30	—	" "
9	62.22	.9690	19.60	65.80	85.40	3.357	13.35	76.93	90.28	5.755	9.80	—	" "
10	60.00	.9420	26.20	59.50	85.70	2.260	18.45	71.82	90.27	3.892	11.10	Paraffin, StearicAcid.	Pure Unbleached Wax
11	63.00	.9620	18.04	74.49	92.53	4.132	13.16	89.95	103.11	6.821	8.70	—	" "
12	63.10	.9581	29.40	71.40	100.80	2.430	21.52	86.19	108.71	4.00	9.66	Stearic Acid	" "
13	59.00	.9431	17.50	71.35	88.85	4.010	12.81	87.03	99.84	6.89	7.00	Paraffin.	" "
14	64.41	.9581	17.50	67.20	84.70	3.842	12.81	81.12	93.93	6.254	13.10	Paraffin. Rosin.	Manufacturing Wax.
15	62.45	.9501	18.91	71.51	90.42	3.776	13.83	86.33	100.16	6.232	9.11	Paraffin.	Pure Unbleached Wax
16	63.76	.9520	20.30	74.20	94.50	3.655	14.86	89.57	104.43	6.027	7.42	—	" "
17	62.81	.9690	21.70	81.90	103.61	3.772	15.89	98.86	114.75	6.221	4.31	Probably Japan Wax.	Pure Bleached Wax.

Below is a table embodying the properties of the various substances employed in adulterating beeswax. A few of the data are those of the writer, but the majority were secured from various sources in literature.*

SUBSTANCE.	Melting point.	15° C. specific gravity.	Acids soluble in water.	Acid number.	Ether number.	Total.	Iodine fixed by one gram of wax.	Volume of Hydrogen at 0° C. and 760 mm. pressure given per Gm.	Hydrocarbons from one gram of wax.
Yellow beeswax...	62–64	.961– .964	0–1	19–21	73–76	91–97	8–11	53–57.5	12.5–14.5
Beeswax bleached by various agents.	63–64	.960– .973	0–2	19–23	74–84.29	93–107.7	1.08–11.36	51–57	11–14.30
Cacao butter......	30–33	.945– .982	0	0–3	192–200	192–204	34	—	—
Carnauba wax	83–84	.999	0	4–6	75–76	79–82	7–9	73–76	1.6
China wax........	53.5	.970	2	22	196	218	6.85	72.3	0
Japan wax........	47–54	.975	2	18–28	194–198	216–222	6–7.55	69–71	0
Mineral wax......	60–80	.918– .952	0	0	0	0	0–0.6	0	100
Paraffin	38–74	.913– .914	0	0	0	0	17–31	0	100
Resin	53.5	1.104-1.108	0	168	10	178	135.6	35	0
Spermaceti	40–50	.945– .96	0	0–2	136–142	136–144	—	—	—
Stearic acid.......	53.5–69.2	.901–1.00	0	204	5	209	2–4	0	0
Suint wax	62–66	—	0	95–115	4–7	102–119	13–18.5	0	14–18
Tallow	42–50.5	.952 .96	0	2.75–5	193–208	196–213	27–40	52–60	0
Vegetable wax....	47–55.6	.947	2	17–19	200–210	218–220	6.6–82	73–74	0

The author's general conclusions are that: Beeswax in our markets is adulterated to the extent of 50 per cent. while in English markets it rises to 66⅔ per cent.

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* 1882, Dieterich, Arch. der Pharm., (3), 20, 454. 1885, O. Dammer, Illustriertes Lexicon der Verfälschungen, etc. 1891, A: and P. Busine, Bull. Soc. Chim. (3), 5, 654. R. Benedikt, Analyse der Fette und Wachsarten, Zweite Auf. 311. et seq.

The melting point of beeswax varies from 62–64° C., it is raised by adding carnauba wax, stearic acid, certain mineral waxes and paraffins. China wax, Japan wax, cacao butter, resin, tallow, spermaceti, vegetable wax, certain stearic acids and paraffins lower it while it is apparently unaltered when adulterated with suint wax, certain mineral waxes, paraffins and stearic acids.

Beeswax varies in specific gravity from .960–.973 and appears to be greatly influenced only by resin, carnauba wax and certain mineral waxes, which increase it, and paraffin which lowers it.

The "Acid Number" ranges from 19–21 Mgs. of potash per Gm. of beeswax. Stearic acid, resin, and suint wax increase while carnauba wax, mineral wax, cacao butter, paraffin and spermaceti decrease the acid number. China wax, Japan wax and vegetable wax do not vitiate the number seriously.

The "Ether Number,' varying from 73–76 Mgs. of potash per Gm. of beeswax, is unaffected by adding carnauba wax but China wax, Japan wax, cacao butter, tallow, vegetable wax, increase it. Mineral wax, paraffin, resin, stearic acid and suint wax decrease it. It must be noted that wax bleached by certain chemical agents may have an ether number as high as 84 and yet be pure.

The percentage of iodine varies from 8–11, yet wax bleached by certain agents, as chlorine, may vary far from these percentages. Paraffin, mineral wax and stearic acid lower the percentage, but cacao butter, resin, suint wax and tallow increase it. China wax, carnauba wax, Japan wax and vegetable wax pass the prescribed limits but very little.

The volume (53–57.5 C.c.) of hydrogen evolved from one Gm. of beeswax and the percentage (12.5–14.5) of hydrocarbons evidently are the most reliable data securable, the former being vitiated by all adulterants except tallow and the latter by all except suint wax.—Amer. Jour. Pharm., 1893, 585.

——— *Adulteration in Morocco.*—From Consular Rep., 1304; Pharm. Jour. Trans., 1893, 404.

A Beeswax Bleachery.—Illustrated article, with description, in Pharm. Era, 1893, 523.—Chem. and Drug., 1894, 584.

Bleaching Yellow Wax.—An improvement consists in first reducing the wax to powder. This is accomplished by passing the melted wax into a hot cylinder, whence it is "sprayed" under a pressure of ten atmospheres. The "spray" is received in a stream of cold air, which causes the fine particles to congeal separately.—Amer. Drug. and Pharm. Rec., 1893, 338.

Castoreum.—An article in the history, production, etc., of castoreum.—New England Drug., 1894, 248; from Chem. and Drug.

History of Castor.—H. Lafite, in Pharm. Post, 1894, 181. The author enters into the history from the earliest time.

Cantharidin.—Preparation by the following process, which is said to yield a product superior to that obtained by other processes: Macerate the pulverized cantharides in acetic ether and add a little sulphuric acid; neutralize with barium carbonate, exhaust with acetic ether, and distill the solution. The residue is evaporated to drynesss, treated with petroleum ether, then with alcohol, to remove resinous coloring matters, and purified by repeated crystallizations. By this process Lytta vesicatoria yielded 0.3–0.45 per cent. of vesicating principle; Epicanta gorrhami, 0.45 per cent., and Mylabris cichorrii, 0.9–1.03 per cent.—E. Dieterich (from Helfenberger Ann., 1892, 1); Jour. de Pharm. et de Chim., 1893, 375.

Cantharidin.—Green by the method of Greenish obtained 0.962 per cent. of cantharidin from cantharides.—Brit. and Col. Drug., 1894, 352.

Carmine.—Sigmund Feitler. The moisture in five samples of pure carmines was respectively 17.00, 15.50, 20.48, 13.15 and 15.69, or on an average 16.36 per cent. The ash ranged from 8.1 to 10.51 per cent., the coloring matter varied from 57.14 to 67.2 per cent. Alumina was present in all the samples, from 25.95 to 43.18 per cent., calculated on the weight of the ash. SnO_2 was present in all, and appears to be essential.—Zeitschr. f. Angew. Chem., 1894.

Coccus Cacti.—P. Meyer observes that the red pigment is not found within any organ apart from the diffuse fatty body and the yolk. Nothing is yet known regarding its use to the insect. Carminic acid is said to be a product of metabolism. The coccerin secreted by the wax glands, which are particularly abundant near the anus, serves to enclose the excreta and so prevent the body of the insect being soiled. Jour. R. M. Soc., 94, 324.

Adulteration of Cochineal.—According to Teyxeira there is found in commerce an artificial cochineal, prepared by coloring exhausted cochineal powder with rosaniline, and forming into grains and sprinkling them with lime. They are easily detected by their irregular form by being heavier than water, and forming a paste with the latter.—Pharm. Zeit., 1893, 505.

Cochineal Coloring Principle.—W. von Miller and G. Rohde again establish its non-glucosidal nature. After boiling carminic acid with dilute sulphuric acid for some hours, unchanged carminic acid and a strong reducing substance of unknown composition can be separated; the latter no doubt has been looked upon as a sugar; formic acid was also produced in this decomposition.—Ber. d. Chem. Ges., 1893, 2647; Apoth. Zeit., 1893, 638.

Carmine.—Interesting particulars in regard to this coloring matter have recently been published by S. Feitler (abstract J. S. C. I., 256), and his experiments reveal the fact that adulteration is freely practised. He analysed six samples, their technical names being: (1) Best Naccarat carmine, (2) best genuine carmine, (3) best genuine carmine, (4) ordinary carmine, (5) antique carmine, and (6) best Naccarat carmine. The last three were adulterated, No. 4 containing 88.5 per cent. of ash, consisting of lead oxide, alumina, and lead sulphate. It had probably been prepared from a sample of eosin with a blue tint by precipitation with lead acetate and alum. No. 5 was much like the sample known as "best genuine," but the ash amounted to 74.56 per cent., and consisted mostly of barium carbonate and some sulphate. According to Bonath it was a baryta lake of corallin. No. 6 was found to be a mixture of genuine cochineal lake and a lake prepared from a coal-tar coloring matter. It contained 15.28 per cent. of ash, 16.08 per cent. of water, 17.31 per cent. of nitrogenous matter, and 51.33 per cent. of coloring-matter (reckoned by difference). The artificial coloring-matter present was identified as a true lake of phloxin. In the genuine samples the ash amounted to 7.09, 9.18 and 7.24 per cent., and this consisted of 35.25, and 43 per cent. of Al_2O_3 and 44.31 and 36 per cent. of CaO. These results practically agree with Dechan's (Chem. and Drug., 1885, p. 518), and it is another warning to chemists not to stock an article which contains much more than 10 per cent. of ash. As the ash of genuine carmine contains neither barium nor lead, the least trace of these should be looked on with suspicion.—Chem. and Drug., 1893, 199.

The Importation of Civet.—A recent writer says it is imported into this country in the horn of the rhinoceros. It comes down to the coast of India in these curious receptacles, and is protected from harm by a membrane placed over the open end of the horn. Its crude perfume is thus brought undisturbed to this port. Each horn contains from eighteen to twenty-four ounces.—Amer. Drug. and Pharm. Rec., 1893, 313.

Preservation of Eggs.—From the result of his investigations, Körndörfer concludes (Arch. f. Hygien., xvi., 4) that the best method of preserving eggs is to warm them for two days to 50° C., or to coat with shellac or varnish. They keep better also in dry than in damp places.

——— A writer (in the Apoth. Zeit., 1894) states that he finds it possible to preserve eggs in a fresh condition by packing them in shavings in a stone vessel and filling up the vessel with paraffin oil. Eggs so treated were found perfectly fresh after being immersed for several months.

Fish Poisons.—A comprehensive article on all the poisons used in killing fish, with descriptions, properties, uses.—J. B. Nagelvoort, in Bull. Pharm., 1894, 65.

Albumen from Fish Eggs.—Water extracts the albumen from fish eggs as follows: The ovisacs having been collected and carefully washed, the eggs are taken out and allowed to lie for 72 hours in three times their weight of water containing 50 per cent. of soda, potash or some other alkali. The fluid is then maintained for a few hours longer at a temperature of 120° C. This dissolves out the albumen in a sufficiently pure state for industrial purposes. The question is, whether fishes' eggs are procurable in the requisite abundance. The author points out that the salmon and trout annually leave deposits along the borders of streams, which might be utilized in this way, as they serve no other purpose, and that in Russia an immense supply would be provided by the sturgeon alone. Should his anticipations in this respect be realized, the idea might prove of great value, as the consumption of albumen is enormous.—Drug. Circ., 1893, 203.

Gelatin.—An article on the different kinds of gelatin and their modes of preparation.—Nat. Drug., 1894, 134.

Solvents of Gelatin.—Liesegang states that gelatin dissolves in lead nitrate solutions at ordinary temperatures, a concentrated solution of the salt at 25° C. dissolving as much as 24 per cent. Ammonium sulphocyanate is still more powerful as a solvent, a solution of five Gm. in ten C.c. of water taking up five Gm. of gelatin.—Jour. Soc. Chem. Ind., 1893.

Adulteration in Honey—Detection of.—Delaye (Bull. de la Soc. Roy. de Pharm., 1893) points out that honey possesses a slight acid reaction, due to traces of formic acid. There are found, too, aromatic and coloring principles, fatty bodies, mucilage, salts, nitrogenous matters and pollen grains. The chief constituents, of course, are dextrose and levulose. Some inferior honeys are liable to fermentation, due to the presence of insect debris, etc. For sophistication of honey, dextrin, glucose, starch, gum, sand, gelatin or even water are used. Natural honey should have a sp. gr. of 1.400 to 1.430. It should contain between 15 and 25 per cent. of water when pure, but no more. This can be determined by drying at 120° C. The maximum quantity of ash should be ½ per cent. Starchy matter is best detected by treating the honey with a mixture of one part of water to four parts of alcohol, agitating and allowing to settle. The deposit is then examined microscopically, and can also be tested in the usual way with iodine. Care must be taken not to confound starch-grains with pollen grains. The presence of much sodium chloride in the ash indicates the admixture of molasses, which will also lower the copper-reducing power. Gum and gelatin are detected by dissolving the honey in a little water, and evaporating to a syrupy consistence, when these adulterations will cause the mass to gelatinize. Gelatin can also, of course, be directly precipitated by tannic acid. Heating with quicklime in a test tube will also cause vapor of ammonia to be given off if gelatin be present. A polarimetric examination of honey is considered essential. The sugar is determined as usual by titrating before and after inversion with Fehling's solution. The lowest amount of invert sugar permissible is 62 per cent., and there should never be more than 8 per cent. of cane sugar. According to Biesterfeld, it is impossible, or nearly so, to detect the difference between pure honey and an artificial preparation of inverted sugar, colored and aromatized; for honey itself is nothing more than inverted sugar. Very useful information can be obtained from the polarimetric results. If a 20 per cent. solution be decolorized with animal charcoal, and one portion be inverted with sulphuric acid, the following indications are fairly conclusive:

Activity of Original Solution.	Activity of Inverted Solution.	Deduction.
Lævo-gyric.	No change.	Pure honey (or inverted sugar).
Dextro-gyric.	Lævo-rotatory.	Adulterated with cane sugar.
Dextro-gyric.	No change.	Adulterated with glucose.
Dextro-gyric.	Dextro-rotatory, but less so.	Adulterated with cane sugar and glucose.

In conclusion, Delaye points out that every sample whose optical activity is greater than $[a]_0 = 1.5°$, is adulterated; as is also any sample whose activity is positive after inversion.

Detection of Glucose and Cane Sugar in Honey.—O. Haenle. Genuine honey from flowers contains no dextrin, or only traces; it rotates the plane of polarized light to the left. A dextro-rotatory specimen is adulterated with starch, sugar or syrup, if it exhibits the dextrin reaction, but with cane sugar, if dextrin is absent. The honey from conifers, which is always brown, contains dextrin; before dialysis it rotates the plane of polarized light to the right; after dialysis it is optically inactive. A suitable dialyzer for the removal of the diffusible constituents is figured and described. It consists of a shallow, wooden box, in which the tray of parchment paper is supported on parallel laths, whilst a slow stream of water flows below it. To detect dextrin, a solution is made of 1 part of the honey (first clarified by warming and stirring) in two parts of water. This solution is decolorized by warming for 5 minutes with 2 per cent. of animal charcoal. 5–10 C.c. is placed in a test-tube and covered with a layer (2 C.c.) of absolute alcohol. A turbidity at the zone of contact indicates dextrin. Although the author's own numbers show that the optical rotation of pure honey is not constant, he gives the following formula for determining the amount of adulteration:

For starch sugar in honey from flowers, $x = \frac{3\,P + p}{10.}$

For starch sugar in honey from conifers, $x = \frac{3\,P - p}{10}$, where P is the rotation of the honey solution (1 : 2), p is the rotation of genuine honey (= 30), and x is the percentage of starch sugar syrup. For cane sugar syrup the divisor 10 is replaced by 4. The validity of the author's conclusions is however disputed by numerous investigators.—Zeitschr. f. Anal. Chem., 1894, 99.

Turkish Honey.—According to Fajans (Apoth. Zeit., 1893, No. 102, 632) this product is consumed in considerable quantities by the lower classes of Austria. It is white, and in fresh condition dry, hard and brittle. On standing in the air it forms a soft, white, smeary mass. The taste is agreeable, afterwards bitter and astringent from the alum. Analysis gave: Water, 7.97 per cent.; invert sugar, 56.78 per cent.; cane sugar, 31.02; ash, 0.31 and 3.93 per cent. insoluble in 80 per cent. alcohol. An analysis of that portion insoluble in alcohol gave 68.09, organic substance; 27.80, alum; 4.08, gypsum.

Oleum Morrhuæ.—F. Lascar regards the nitric acid test as the best one for the purity of the oil. Genuine cod liver oil, to which a few drops of nitric acid are added, becomes at once of a red color where the two liquids meet; when shaken, the mixture becomes a deep red, which on standing for five or six hours, becomes yellowish-red.—Drug. Circ., 1893, 198.

——— *Composition of.*—M. Gautier and L. Mourgues.—The volatile bases extracted from cod liver oil by distillation are: Butylamine, amounting to one-sixth of the total bases; amylamine, one-third of the whole; hexylamine, a small quantity; dihydrotoluidine, equal to approximately one-tenth of the total bases. The non-volatile bases are: Aselline, morrhuine, forming nearly one-third of the total bases. The acids in combination with bases are: Morrhuic acid, a mixture of formic and butyric acids; a small quantity of phosphoric acid derived from the phosphates, phosphoglycerates, and the lecythines.—Chem. News, 1894, 293.

Pharmacology of Cod Liver Oil.—M. Patien, in Montreal Pharm. Jour., 1894, 49.

Artificial Musk.—Mollman has patented, in Germany, a process for the manufacture of musk, which is thus described in the application: One molecule of water is removed from camphor by the action of melted zinc chloride or phosphoric anhydride, and the products of the reaction are submitted to fractional distillation. All that passes over between 180° and 230° C. is rectified over calcium chloride, and is mixed with 1 volume of amylic alcohol. The solution is introduced, a little at a time, into five times its volume of sulphuric acid of Nordhausen and 7 volumes of sulphuric acid of 66°. After agitating three or four hours, the liquid is diluted with water and neutralized with sodium carbonate. It is again agitated with amylic alcohol, and the amylic solution separated by decantation, agitated with lead acetate, and the yellowish supernatant fluid decanted. Afterwards it is evaporated by very gentle heat. The amorphous product thus obtained is treated with a mixture of equal parts of fuming nitric acid and sulphuric acid of 66°, and then thrown into cold water. The precipitate, recrystallized and purified, has the odor of natural musk.—Nat. Drug., 1894, 116.

Filtration of Solutions of Pepsin.—Wearn proposes to add milk-sugar to the solution. It does not dissolve, and is said to greatly facilitate filtration, the liquid coming away perfectly limpid. The sugar acts purely mechanically.—West. Drug., 1893, 364.

Comparison of the Pepsin of Commerce to Normal Stomach Secretion.—Konowatow, in Dissertation, St. Petersburg. See Wratsch, 1893, 1664; abstract in Pharm. Post, 1894, 75.

Valuation of Pepsin.—E. H. Bartley employs the following:

Solution No. 1.—Take the whites of several fresh eggs, mix them thoroughly, and to 100 Gm. of the mixed egg albumen add 900 C.c. of distilled water, or in this proportion if smaller quantities are used. Mix the solutions well, and boil from 3 to 5 minutes. After cooling, make up the solution with water to the original volume. The solution may be strained, if necessary, through fine muslin. As egg white contains, on an average, about 12.2 per cent. of dry albumen, 100 C.c. of this solution will contain 10 Gm. of egg white, or 1.22 Gm. of dry albumen.

Solution No. 2.—Weigh out one Gm. of the pepsin to be tested, add to 25 C.c. of water, and then add 2 C.c. of diluted hydrochloric acid U. S. P. Now add water enough to make the solution up to 50 C.c.; or, if it be a high-grade pepsin, make up to 100 C.c. after adding 4 C.c. of diluted acid.

Procedure.—Measure out into a beaker or bottle 50 C.c. of the albumen solution, and warm in a water-bath to 35° to 40° C. Now add to this solution 2 C.c. of diluted hydrochloric acid, U. S. P., and from one-half to five C.c. of the pepsin solution. The more active the pepsin the less the quantity to be taken. In the valuation of high-grade pepsins it is best to use 100 C.c. of albumen solution, containing 10 Gm. egg-white, and 1 C.c. of pepsin solution, containing 0.010 Gm. pepsin.

The time when the pepsin is added must be carefully noted, and the temperature of the solution must be kept between 35° and 40° C. At intervals of 10 minutes, after the first hour, draw out a few drops of the solution with a nipple pipette (dropper) and float it upon a small quantity of pure nitric acid in a conical minim glass. The digestion is incomplete as long as a white zone of coagulated albumen appears at the line of contact of the two fluids. Note the time when the nitric acid ceases to give this coagulation. This end reaction can generally be easily determined. We thus get three elements in the calculation of the digestive power of the pepsin, viz.:

The weight of the egg-albumen, A.

The weight of the pepsin taken, P.

The time consumed, T.

The relation between the quantities of albumen and pepsin is expressed by the fraction: $\frac{A}{P}$, *i. e.*, it is found by dividing the amount of albumen, 5 Gm., in the above directions for weaker pepsins, by the amount of pepsin used when 1 C.c. of the solution above mentioned is taken for the test, viz., .02 Gr. This would give as the amount of albumen digested by one part of pepsin in the observed time of the experiment 250 Gr. But the time is not the standard time. Assume that the time required for the digestion was 2 hours. The relation of this to the standard time, 3 hours, would be $\frac{3}{2}$. The above result must then be multiplied by this ratio in order to give the amount of albumen capable of being digested in the standard three hours. To put this in the form of an algebraic equation we have D (digestive power) $= \frac{A}{P} \times \frac{3}{T}$. Substituting the above values we have:

$$D = \frac{5}{.02} \times \frac{3}{2} = \frac{15}{.04} = 375 \text{ Gm.}$$

That is, 1 Gm. of this pepsin is capable of digesting 375 Gm. of egg albumen in three hours, or 750 Gm. in six hours.

As egg-white contains about 12.2 per cent. of dry albumen, 1 Gr. of this pepsin will digest 45.75 Gr. of dry albumen in 3 hours or 91.5 Gr. in 6 hours.

The advantages claimed for this process over the U. S. P. method are:

1. The shorter time consumed.

2. Uniformity in results.

3. The avoidance of the necessity for shaking the solution during digestion.

4. A more exact statement of results.

5. The weaker solution of albumen used gives less interference with the action of the pepsin by the peptone formed.—Amer. Drug. and Pharm. Rec., 1894, 212.

Pepsin—Tests for.—J. C. McWalter refers to the comparative tests of Von Grup-Besanez and that of Grützner.—Drug. Cir., 1893, 198; from Brit. and Col. Drug., 1893.

The Bengal Shellac Industry.—Article on its manufacture.—Chem. and Drug., 1894, 790.

Diminishing Shellac Supply.—On account of diminished supply of sticklac.—Ibid., 568.

The Latex of the Lac Tree.—G. Bertrand. This juice resembles a thick cream of a light blond color; it has a slight odor like that of butyric acid, and it reddens blue litmus. With alcohol it yields laccase, a precipitate chemically identical with the gums, and laccol, a very oxidizable liquid. Lac is produced by the successive influence of oxygen and of diastase.—Compt. Rend., cxviii., No. 22.

Making Silk from Wood.—An account of Count de Chardonnet's invention by which wood pulp or cotton is converted into silk.—Nat. Drug., 1893, 34; from Consul Loomis' Report of St. Etienne, France.

Silkworm Gut.—Wm. Lodian. Article on the manufacture and uses of silkworm gut.—Pharm. Era, 1894, 103; also, Registered Pharm., 1894, March; from Internat. Jour. Surg.

To Pulverize Spermaceti.—M. Hollandt says that spermaceti may be obtained in the shape of an impalpable powder, by melting it at a very gentle heat, pouring it into a warm mortar, and agitating it until perfectly cold.—Nat. Drug., 1893, 139.

Milk Sugar—American.—W. B. Thompson calls attention to this industry in America.—Amer. Jour. Pharm., 1894, 78.

Bacteria in Milk Sugar.—According to A. Naumann (Berl. klin. Woch.), the milk sugar of commerce is very often tainted by microorganisms, proceeding from the milk employed in its production. Sterilized milk coagulated when such sugar was added to it. For this purpose, therefore, only a perfectly pure article should be used, and the milk should afterwards be sterilized.—Drug. Circ., 1893, 250.

Sugar of Milk.—A recent examination of a milk sugar, stated to be unsuited for "infant's food," has shown that the characters and tests of the British Pharmacopœia, and even the more stringent requirements of the German and United States Pharmacopœias, are insufficient to ensure purity.

This sample of milk sugar, answering to the tests of the three pharmacopœias above-mentioned, was found to coagulate fresh milk when heated with it to nearly boiling point. A number of samples having been obtained, and each one tested by boiling one Gm. of the milk sugar with ten cubic centimetres of fresh milk, it was found that out of twelve samples four caused coagulation of the casein. A more complete examination showed that these four samples were further distinguished by the high percentage of ash which they yielded on incineration. In three instances this ash was almost entirely magnesia, and in the fourth contained calcium in addition.

This leaves but little doubt that in the case of these four samples, magnesia or the carbonate of magnesium had been added in the process of manufacture to neutralize the acidity of the whey during crystallization, with the result that lactate of magnesium crystallized out with the milk sugar. Since many metallic salts, including those of magnesium, are known to coagulate milk, some neutral magnesium lactate was prepared. It was found that the addition of a very small amount of this salt to fresh milk caused the coagulation of the casein on boiling, and further, that when 5 per cent. of the salt was added to a sample of sugar of milk, which previously was without any action on boiling milk, immediate and complete coagulation resulted.

The following table shows the results of some comparative experiments, in which it will be noticed that those samples which cause coagulation of casein are those which yield an excessive ash. (It is probable that numbers 1, 8 and 12 were originally obtained from the same manufacturer.)

No.	1 Gm. boiled with 10 C.c. fresh milk.	Amount of ash, per cent.	Composition of Ash, per cent.	Percentage of Lactate (Mg or Ca) in Ash.	Acidity in Terms of Lactic Acid, per cent.
1	Coagulates.	1.53	1.343 MgO.	6.78 Mg.	0.018
2	Nil.	0.21	Mg & Ca.*	—	0.018
3	Nil.	0.32	Fe, Mg, Ca.*	—	0.072
4	Nil.	0.10	Mg.*	—	0.054
5	Nil.	0.09	Mg.*	—	0.036
6	Nil.	0.08	Mg.*	—	0.018
7	Nil.	0.03	Mg.*	—	—
8	Coagulates.	1.6	1.35 MgO.	6.8 Mg.	—
9	Nil.	0.03	Mg.*	—	0.072
10	Coagulates.	1.16	0.76 MgO. 0.22 $CaCO_3$.	3.83 Mg. 0.47 Ca.	0.036
11	Nil.	0.02	Mg.*	—	—
12	Coagulates.	1.48	1.36 MgO.	6.9 Mg.	0.018

* Traces only.

It seems desirable, therefore, that in the official tests for sugar of milk the amount of ash should be directed to be determined, and that this should not be allowed to exceed 0.25 per cent.—J. O. Braithwaite, in Pharm. Jour. Trans., 1894, 853.

Sugar of Milk Test.—P. Woltering makes the following test: To one quantity of milk, diluted with an equal volume of water, common sugar of milk is added—5 per cent. of the milk; in another quantity 5 per cent. recrystallized sugar of milk is dissolved. The milk thus prepared is now sterilized and exposed for five days to a temperature of 40° C. After the lapse of that time the milk in which recrystallized sugar of milk is dissolved is as good as ever, while that containing the common sugar of milk is entirely spoiled.—Med. Tijdschr. v. Pharm. Chem. and Toxic., Sept., 1893; Bull. Pharm., 1893, 5, 5.

Sponges, their Structure and Life History.—T. S. Wokes describes the general zoölogical character of the sponge with the principal varieties of British sponges.—Pharm. Jour. Trans., 1893, 516.

Trieste Sponge Trade.—Chem. and Drug., 1893, 528.

Turacin.—A lecture on this remarkable animal pigment containing copper found in the red parts of the web of turacos, by A. H. Church.—Pharm. Jour. Trans., 1893, 128.

CHEMISTRY (INORGANIC) AND PHYSICS.

Practical Electricity for the Druggist.—W. N. Sherman suggests method of druggist possessing a small plant of his own.—Pacific Drug., 1893, 36.

Cadmium and Sal-Ammoniac Battery.—A. Ditte. Cadmium in the cold has no action on a solution of ammonium chloride, but its oxide may combine with the chloride, yielding transparent crystals decomposable by water and containing $2(NH_4Cl)CdO$.—Compt. rend., 1893, No. 20.

Leclanche Battery.—A. Ditte.—When the zinc platinum couple is immersed in a solution of ammonium chloride, not only is the solution decomposed and the zinc oxidized, but the zinc oxide can act on the alkali chloride. At the ordinary temperature, the decomposition is more rapid the stronger the ammonium chloride solution. Hydrogen is evolved and compounds are formed which contain zinc oxide and ammonia in proportions that depend on the concentration of the solution. Apart from secondary reactions, the decomposition of ammonium chloride by zinc is exothermic. No precipitate is formed because the zinc oxide is soluble in ammonia solution, but ammonia tends to accumulate in the upper part of the liquid and zinc chloride in the lower layers. The resistance is lessened, and decomposition accelerated, by substituting for the plate of platinum a porous cell containing a mixture of carbon and manganese peroxide. With a solution containing 10 per cent. of ammonium chloride, the secondary product is $2NH_4Cl,4ZnO,9H_2O$, which crystallizes as soon as the solution is saturated. When only a small quantity of ammonium chloride remains, zinc oxide separates and mixes with the crystalline compound. If the original solution contains 15 per cent. of ammonium chloride, the crystalline product is $2NH_4Cl,ZnO$, which tends to separate at first in the upper part of the liquid In the lower part of the liquid there is very little free ammonia, and a double zinc ammonium chloride is formed; and by reason of its specific gravity tends to remain at the bottom of the vessel, and thus accelerate the solvent action on the lower part of the zinc.—Compt. rend., cxvi., 984–986.

Electrochemical Means of Observing Alternating Currents.—P. Janet. The measurements of alternating currents present two peculiar elements, nothing analogous to which is found in the case of continuous currents: the frequencies and the differences of the phases. Hitherto no great importance has been attached to the measure of the frequencies; but there are cases where it is well to measure them directly, e. g., that where a laboratory receives an alternating current from a remote central station. As regards the difference of phases, it is important to institute a simple method fairly exact for ordinary cases. To this end the author arranges on a metallic registering cylinder a sheet of paper steeped with the solution of potassium ferrocyanide and ammonium nitrate as used in Bain's electrochemical telegraph. On this paper there acts a style of iron or steel. He makes communication with the cylinder on the one hand, and the point of iron on the other, with the two points between which he wishes to study the periodic electro-motive force. If the cylinder is caused to rotate rapidly, he obtains a discontinuous trace of Prussian blue, the maxima of which correspond to the maxima of the electro-motive force in question.—Compt. Rend., cxviii., No. 16.

A Cadmium and Ammonium Chloride Battery.—A Ditte. The electrolysis of a solution of ammonium chloride by a cadmium platinum couple is exothermic, even when the heat of formation of the double ammonium cadmium chloride is left out of account. The ammonia tends to accumulate in the upper part of the liquid and the cadmium chloride in the lower part; but since cadmium oxide forms most rapidly where the ammonia is present, the upper part of the liquid becomes saturated with the compound $2NH_4Cl,CdO$, which crystallizes at the surface. The substitution of an agglomerate of manganese peroxide, or a porous cell containing the peroxide, for the platinum, accelerates the change, and a layer of crystals of the compound $2NH_4Cl, CdO$ forms round the upper part of the zinc rod. The cadmium chloride tends to accumulate in the lower part and the ammonia in the upper part of the liquid, but at some intermediate point the two products are present in the proportions required to form the compound $2NH_4Cl,CdO$, and the latter separates out gradually, forming a kind of diaphragm dividing the liquids into two parts of different composition. Since, however, in this layer the resistance is smaller than in any other part of the liquid, the cadmium is more rapidly attacked at this point than anywhere else. The manganese peroxide seems to have no other function beyond that of rapid depolarization.—Compt. rend., xvi., 1128–1131.

Apparent Death Produced by Alternating Currents—Resuscitation by Artificial Respiration.—D. d'Arsonval contends that the death produced by an electric shock is only apparent, and that persons who have been struck by lightning should be treated as if drowned.—Compt. Rend., cxxiii., No. 21.

Voltaic Cells with Fused Electrolytes.—J. Brown. In instituting a comparison of the observed electro-motive forces of cells with their theoretical values, as given by "Thomson's law," the simpler the construction of the cell, the easier it is to ascertain the nature of the chemical action on which the calculation rests. In cells with aqueous electrolytes, the solvent introduces several irreducible complications, arising from possible action of the solvent itself as an electrolyte, from the formation of insoluble films (either inactive and protective, as oxides, or active, as hydrogen), or from the uncertainty of calculations involving heats of solution of the products of voltaic reaction.

When the liquidity of the electrolyte is produced by fusion instead of by dissolution, these complications are to a large extent avoided; and, as a matter of experiment, two fluid cells made up of metals, immersed each in its fused chloride, give results nearer the "theoretical" values than those obtained with aqueous solutions. This is specially noticeable in the case of metals with high heats of oxidation, for example, magnesium and aluminum. The electro-motive forces of cells containing pairs of the metals tin, lead and zinc, come out nearest to the theoretical values. The other metals which were tried did not give so close an agreement, but could be brought into agreement by applying constant corrections, one for each metal; and reasons are given for attributing these corrections to the high temperature of the cells, as compared with the temperatures for which the recognized heats of combination are true.

Four of the cells were tested by passing currents through them in both directions alternately, and noting the electro-motive force after the passage of each current. Polarization was observed in the case of zinc-silver; in the others it was practically absent.—Proc. Roy. Soc., lii, 75–91.

Depolarizers—Nature of.—H. E. Armstrong.—Pharm. Jour. Trans., 1893, 57.

How to Show Lines of Electric Force.—The following experiment for making visible lines of electric force is described by Bruno Kolbe: Into a flat cylindrical vessel pour purified anhydrous oil of turpentine to a depth of about two Cm., and add some sulphate of quinine. To the rim of the vessel attach two wire springs, adjusted so that the two small metallic balls at their ends dip into the turpentine. Stir the quinine with a glass rod so as to distribute it evenly, and place the vessel on a black cardboard. Join the two wires to the terminals of an influence machine, and turn very slowly. At once the white crystals group themselves so as to form beautiful curves, representing the "lines of electric force." The form of these curves recalls that of the brush discharge of the influence machine. Weiler gives the following experiments: Prepare a milky mixture by stirring up finely divided quinine in oil of turpentine. On sending a series of discharges through it, a clearance is produced at the positive pole, and the particles cluster round the negative pole, arranging themselves in streamers.—West. Drug., 1894, 61.

To Distinguish Between Two Poles of a Galvanic Battery.—Moisten a piece of filter paper with the following solution:

Glycerin	50	Gr.
Distilled water	20	Gr.
Alcohol	10	Gr.
Nitrate of potassium	3	Gr.
Phenolphthalein	0.05	Gr.

Bring both wires in contact with the paper; that corresponding to the negative pole will be surrounded by a violet-red halo.—Drug. Circ., 1893, 226.

Physical Researches by the Aid of Electric Illumination.—C. V. Boys showed photographs taken by the electric spark of soap bubbles in the act of bursting, and explained the process by which it is possible to ascertain the respective speed at which different soap bubbles burst. One photograph showed an issue of liquid from a very small pipe, which to the naked eye appeared to be a perfect stream, but which, on an electric photograph being taken, was resolved into a beautiful and regular series of drops. In connection with this, Boys remarked that the science of liquids and of the forces involved in the phenomena of the surface of liquids was one of the most interesting branches of physical science. The effect on a fountain of playing or singing was to change its appearance into one, two, or three apparently separate, clear streams of liquid: but a photograph taken as a tuning fork was struck demonstrated that the water was disposed in drops in perfect regularity. A picture of a rifle bullet passing through the air at the rate of 2,000 feet a second was also exhibited. Boys, however, showed that if it were wished to investigate what was really happening when a rifle bullet was being projected through the air at the maximum possible speed, it would be necessary to have recourse to a method of illumination infinitely more rapid than the electric spark. For this purpose a mirror of steel, about the size of a 25 cent piece, is now used. It is so mounted as to revolve with ease, without getting hot, at the enormous speed of about 1,000 times a second, and the end of the beam of light given off from this mirror passes across the screen at such a rate that it enables photographs to be taken in about one ten-millionth of a second.—West. Drug., 1894, 23.

Cadmium Mirror from Zinc Used in Ludwig's Test.—According to E. Ludwig's method, mercury is precipitated from urine by means of zinc powder. It is necessary to remark that commercial zinc powder contains cadmium. Zinc powder, according to Ludwig's method, was somewhat strongly heated in a covered porcelain crucible. When cold it was placed in a tube stoppered with asbestos, superstratified with copper, and the open end of the tube drawn out to a point and closed by fusion. On moderate heating, not exceeding the temperature necessary for the expulsion of the mercury, a metallic mirror was obtained which in appearance could scarcely be distinguished from a mercurial mirror. On stronger ignition shining globules were observed at the beginning of the capillary part of the tube closely resembling drops of mercury, but on the touch they proved to be hard granules of metallic cadmium. The proportion of cadmium in the zinc powder used was 1.63 per cent. It was not completely removed by strong ignition, as cadmium is volatilized very slowly. The same zinc powder, after ignition for an hour in a current of hydrogen, still retained 1 per cent. of cadmium. An examination of the metallic mirror obtained by the iodine test must never be omitted; or, copper powder or copper turnings may be used instead of zinc powder.—Ibid., 58; from Chem. News, 1893.

General and Physical Chemistry.—Review of progress is to be found in Chem. Zeit. (Repertorium), Ber. d. Chem. Ges., Compt. rend., Jour. Chem. Soc., Chem. News.

System of Precise Atomic Weights Founded upon the Diamond as a Standard.—G. Heinrichs condemns the use of hydrogen as a standard for atomic weights, and proposes instead carbon in the form of diamond. He holds that the standard material should be solid, compact, so as to avoid absorptions, very hard, to resist the mechanical effect of the necessary manipulations, and of great chemical resistance, to permit of the elimination of alien impurities by, *e. g.*, ebullition in aqua regia.—Compt. rend., cxvii., No. 26; Chem. News., 1894, 25.

Atomic Weights of Precision Determined by Means of Silver as a Secondary Standard Substance.—G. Heinrichs (Compt. rend., March 5, 1894). If we compare the values of the atomic weights obtained and the absolute weight of the silver used, we see immediately that the variation of the atomic weight found is a very simple function of the weight of the silver used.

Recent Science.—Prince Kropotkin deals with recent speculations as to the structure of the chemical molecule, especially as exemplified in complex organic compounds, and shows how, under the unitarian system, the conceptions of modern chemistry have been widened, and a powerful impulse given to research.—Nineteenth Century, Aug., 1893.

Theory of Chemical Types.—F. Flavitzky. This paper adduces further evidence in favor of the author's theory of the correlation of the oxygen and hydrogen compounds of the elements. It shows that the general type represents all the compounds of the elements, including the so-called molecular compounds; this being especially evident in the case of the halogen derivatives, such as the single and double haloid salts, with their water of crystallization.—Ber. d. Chem. Ges., xxvi., 1534–1538.

NOMENCLATURE.

Uniformity of Nomenclature for Physical Phenomena.—Fitzgerald and Trouton propose (in Nature) a method whereby different aspects of the same phenomena may be discriminated by appropriate terminations, something that has already been tried with fair success in the single department of electro-magnetism. For instance, the general phenomenon of the passage of electricity through conductors is called conduction, its amount, measured in appropriate units, conductance, and its degree in one substance, as compared, for instance, with that of some other, conductivity. Adopting always the suffix -tion for the phenomenon, -ance for its amount, and -ivity for its specific degree, we should have a series of such words as absorption, absorbance, absorbivity; diffusion, diffusance, diffusivity; friction, frictance, frictivity; solution, solutance, solutivity, etc. Some of these words would be rather forbidding, for instance, "heatance" and "heativity," "but," say the authors, "remembering similar fears (which subsequently proved groundless) in electro-magnetic matters, one is afraid to say they are due to more than unfamiliarity."—Nat. Drug., 1894, 43.

Carbon Compounds—Nomenclature and Formulæ of.—Pharm. Jour. Trans., 1893, 86.

Chemical Nomenclature.—F. A. Flückiger writes that in chemistry the misuse of personal names has only occurred in isolated cases, and commends a nomenclature based on commemoration or association, or as a particular attribute as desirable, as: Cathartin, Chlorophyll, Chrysamonin, Chrysophan, Ekgonin, Emetin, Dulcit, Kryptopin, Naringin, Pikrotoxin, Prinarsäure, Resorcin, Sinalbin, or Brasilin, Cusconin, Javanin, Nataloin, Surinamin.—Pharm. Rund., 1894, 22.

Rules Adopted by the American Philological Association.—The following are given in Notes on New Rem., 1894, 184:

Drop silent *e* when fonetically useless, *e. g.*, medicine.
Drop *a* from ae having the sound of *e*, *e. g.*, caecum.
Drop *e* from ea having the sound of *a*, *e. g.*, heart.
Drop *o* from eo having the sound of *e*, *e. g.*, jeopardy.
Drop *o* from oe having the sound of *e*, *e. g.*, oesophagus.
For *o* having the sound of u write *u*: thus tongue, *tung*.
Drop o from ou having the sound of *u*, *e. g.*, slough.
Drop final *ue* in words like tongue.
Drop the *h* in ch in cholera, etc.
Write *f* for ph, *e. g.*, camphor.

EDUCATIONAL.

How Chemistry is Best Taught.—C. F. Mabery urges personal contact of lecturer with student and experimental work.—Science; Pharm. Era, 1894, 346.

The Relation of Teaching to Research in Chemistry.—W. E. Stone considers the attitude of teachers of chemistry toward research. In America, he says, there is a less degree of activity and attainment in scientific research, and a weaker interest in the spirit of investigation.—Jour. Amer. Chem. Soc.; Pharm. Era, 1894, 203.

Education of Industrial Chemists.—H. Pemberton, Jr.—Jour. Amer. Chem. Soc., 1893; Pharm. Era, 1894, 8.

The Cross-Fertilization of the Sciences.—An article on the evolution of chemistry and physics.—Jour. Amer. Chem. Soc., 1893; Pharm. Era, 1894, 9.

How shall Young Men be Educated in Applied Chemistry?—P. T. Austen points out some of the more important subjects for a curriculum.—Pharm. Era, 1894, 457.

Education.—Bayer.—School of Mines Quart., xiv., 248.

Organization and Management of Chemical Works.—J. Carey.—Jour. Soc. Chem. Ind., xii. 901.

Chemical Theory.—The Fundaments of.—J. E. Trevor treats of the development of science and the rationalization of chemistry.—Jour. Amer. Chem. Soc.; Pharm. Jour. Trans., 1894, 962.

Chemical Constitution.—The Polariscope in Relation to.—Percy Frankland, in Pharm. Jour. Trans., 1894, 971; from Chem. News, 1894.

Chemical Energy.—W. Ostwald discourses on the importance of this science of physical chemistry.—Pharm. Jour. Trans., 1894, 611; from Jour. Amer. Chem. Soc.

Practical Inorganic Chemistry.—Tables and Notes adapted for the Science and Art Department Syllabus, 1893. By W. French. Burg.: E. W. Smith.

Teaching of Equations, an Aid to.—J. Leicester has found the following apparatus of use in teaching equations, chemical problems, and in familiarizing young students with the appearance of various substances taking part in chemical interactions.

The apparatus is of wood, about a yard long. The equations are printed on long cards which run between grooves. Test tubes fitted with various substances are introduced through the holes in the top. At the lower front of the frame is also a grooved space, into which the atomic weights, calculations, etc., can be introduced. A good exercise is to make the students perform the experiment, separating the products and then filling the tubes with the same.—Chem. News, 1894, 139.

Lectures on Inorganic Chemistry Arranged in Accordance with the Natural System of the Elements.—L. Meyer. In a lecture before the German Chemical Society, the author explains how, for some years past, he has made use of the periodic system in giving instruction in inorganic chemistry. He claims that the advantages obtained by making use of this method of classification are so great that he is now able to cover the whole of the ground in little more than 80 lectures, in spite of the fact that these are very fully illustrated by experiments.

The course commences with an explanation of the position occupied by chemistry among the other sciences, and of its relationship to these, and more especially to physics. A short historical account of the progress of chemistry follows, this being brought down to the time of Lavoisier, and serving to introduce an examination into the composition of air and of the nature of combustion. In connection with the phlogiston theory, hydrogen is brought forward, and the composition of water made the subject of investigation. The constancy in the combining proportions of hydrogen and oxygen by weight and by volume is exemplified, and the student in this way becomes acquainted with the eudiometer and with decomposition by electrolysis. The atomic theory is also briefly spoken of in this place. The elements oxygen, nitrogen, and hydrogen having been thus introduced, the elements generally are spoken of, together with their distribution in nature and relative importance. The laws in accordance with which they enter into combination with one another are considered at some length, the atomic theory being brought forward historically, and the laws of Dulong and Petit, and of Avogadro, are fully discussed. At the same time the historical treatment permits of the introduction of the electro-chemical theory. In speaking of the electro-chemical equivalents and Faraday's laws of electrolysis.

The meaning of atomic weights being now rendered evident, the arrangement of the elements in the periodic system is at once explained. The author then starts with a consideration of the compounds of hydrogen with the elements, beginning first with those of Group VII., this serving to illustrate practically the similarity to be looked for in analogous compounds of elements belonging to the same group, and also the regular change in valency, in passing from one group to the next. After these preliminaries, the elements and their compounds are considered seriatim, commencing with Group I. in the periodic system. It is considered advisable, however, in dealing with the elements in this manner, to reserve the heavy metals in the first four groups to be discussed at a later period, the sub-groups being first alluded to when Group V. is reached, and then subsequently taken in the following order:

V.	VI.	VII.	VIII.	I.	II.	III.	IV.
V.	Cr,	Mn,	Fe, Co, Ni,	Cu,	Zn,	Ga.	Ge.
Nb,	Mo,	——	Ru, Rh, Pd,	Ag,	Cd,	In,	Sn.
Ta,	W,	——	Os, Ir, Pt,	Au,	Hg,	Tl,	Pb.

Under the headings of the metals only those compounds are considered which may be regarded as derived from the hydrogen compounds previously spoken of, as, for instance, the oxides, sulphides, and chlorides. Salts of the oxy-acids are taken when the acid itself is under discussion, the author being inclined, from practical experience, to look on this side as the better method of treatment, and one by means of which useless repetition may be avoided.—Ber. d. Chem. Ges., xxvi., 1230–1250.

Ancient Chemical Apparatus and Laboratories.—H. C. Bolton.—Trans. (N. Y.) Acad. Nat. Sci., 1893, Vol. xii.; Pharm. Era, 1893, 200.

Chemical Action—Light Intensity and.—W. de W. Abney.—Pharm. Jour. Trans., 1893, 72; from Photography, July 6, 1893.

Chemical Change—Conditions Determinative of.—H. E. Armstrong.—Pharm. Jour. Trans., 1893, 56.

Chemical Synthesis—Attempt at a General Method of.—R. Pictet.—Compt. rend., cxvi., 1057; Chem. News, 1893, 279.

The Chemistry of Cleaning.—V. Lewes, in Chem. and Drug, 1894, 311.

Action of So-called Inert Substances on Liquids.—Chemists have long sought to explain the role played by "inert" substances in certain chemical reactions, wherein a body "seems to act by its mere presence without taking obvious part in the reaction brought about." A paper by Gore gives a hint which may serve as a beginning of the solution of the problem. Gore found that when a solution of a salt (or other substance) is poured over an inert powder, silica for instance, and the mixture allowed to stand for several hours, on decanting the greater part of the solution and examining it there is usually a difference in strength between it and the residue left adherent to the silica. One hundred and forty solutions were tested in this manner; in 30 there was no detectable difference; in 13 the part which adhered to the silica was weaker, and in 97 cases it was stronger than the decanted solution, in some instances notably so. Gore's conclusion is that the inert substances and fine powders generally have the power of abstracting dissolved substances from their solutions. He suggests that this fact throws a light on the purification of water by filtration through sand, soils, etc. More light is, however, needed on the subject.—Nat. Drug., 1894, 116.

Effect of Low Temperature on Chemical Action.—Pictet has been engaged on some very interesting investigations of the effect of low temperatures on chemical action. From theoretical considerations he has deduced the conclusion that chemical action should be impossible under these conditions, and his experience, says a writer in the Atheneum, shows this to be the case. Slightly diluted sulphuric acid, solidifying at —56° C., was intimately mixed at —125° C. with finely powdered caustic soda, and the mixture strongly compressed, but there was no sign of chemical action. On allowing the temperature to rise to —80° C., action suddenly commenced, and became so violent that the containing vessel was broken. Similar results were obtained with sulphuric acid and potassa. Concentrated ammonia solution and sulphuric acid are without action on one another at —80°, but complete action suddenly sets in at —60° to —65°. Common salt and sulphuric acid do not react at —50°, nor is there much action until the temperature reaches —25°. Moderately dilute sulphuric acid does not attack carbonates at —80°; bubbles of gas begin to appear between —60° and —50°, but brisk effervescence does not set in until the temperature has reached —30° or upwards. Similar results were obtained with nitric acid in place of sulphuric acid, but the temperature at which action commenced was rather lower in each case. Metallic sodium is not attacked by aqueous alcohol below— 48° C. Metallic sodium and dilute sulphuric acid are without action on one another at —85° C., but when the temperature rises to —50° reaction commences and becomes so violent that the hydrogen evolved inflames spontaneously. Sulphuric acid does not give a precipitate with an alcoholic solution of barium chloride at —85°, neither is alcoholic silver nitrate precipitated by hydrochloric acid at —125°. Even the very sensitive vegetable colors are not affected at very low temperatures ; thus blue litmus is not reddened by sulphuric or hydrochloric acid at —120° C., and alcoholic potassa does not give a coloration with phenolphthalein at —135°. From these and similar experiments Pictet draws the conclusion that chemical reaction cannot occur between —125° and —150° C.—West. Drug., 1894, 8.

Action of Dry Ammonia on Dry Carbonic Anhydride.—R. E. Hughes and F. Soddy.—Ammonia, carefully dried by means of soda lime, solid caustic soda, and ignited lime, and carbonic anhydride, carefully dried by means of sulphuric acid and phosphoric anhydride, are found not to react when mixed together.—Chem. News, 1894, 138.

A New Blow-pipe Arrangement.—Wm. H. Hamlet, in Chem. and Drug., 1893, 182. It consists of the usual fine platinum jet fastened to a brass tube, jointed on to a sliding-rod inserted into a brass stand, by which means the jet may be inclined to any desired angle.

Deterioration of Crucibles.—Dittmar and Prentice find that on fusing KOH or NaOH in silver or gold crucibles, dehydration is practically complete in 10 minutes. The action of fusing KOH on gold is very slight in an atmosphere of H, and though much greater relatively in air, is absolutely very trifling. Fusing NaOH had practically no action either in H or air. The action on Ag is perceptible, being naturally much greater in air. KOH is much more active in attacking Ag than NaOH.—Jour. Soc. Chem. Ind., xii., 248.

Oven for the Prevention of the Explosion of Sealed Tubes.—C. Ullmann. In order to prevent, or in any case minimize, the risk of explosion of sealed tubes, the author introduces the sealed tubes into a strong steel tube, tested to 600 atmospheres, and containing 40–70 C.c. of ether, light petroleum, or other suitable liquid which does not attack glass at a high temperature. The steel tube is closed by means of a screwed cap and leaden washer, and heated as usual in a stove to the requisite temperature. The pressure caused by the vapor tension of the liquid in the steel tube more or less counteracts the pressure inside the glass tube, and thus reduces the risk of explosion to a minimum. In cases where the glass tube contains acid, pieces of lime are introduced into the steel tube to prevent corrosion of the latter in case of failure of the glass.—Ber. d. Chem. Ges., 1893, 379.

SALTS.

Solubility of So-Called Insoluble Salts.—A. F. Hollemann (Pharm. Ztg., 1893, 624) has determined the solubility of a number of extremely sparingly soluble salts, by means of the electrical conductivity of the solutions in question. The author has attained the following results:

		Soluble in Parts of Water.
Barium Carbonate	at 8.8° C.	64.070
" "	" 24.2° C.	45.566
Barium Sulphate	" 18.9° C.	320.000
" "	" 37.7° C.	429.700
Calcium Carbonate	" 8.7° C.	99.500
" "	" 23.8° C.	80.000
Calcium Oxalate	" 13.6° C.	148.220
" "	" 24.6° C.	124.400
Silver Bromide	" 20.2° C.	1,971.650
" "	" 38.4° C.	775.300
Silver Chloride	" 13.8° C.	775.800
" "	" 26.5° C.	384.100
Silver Iodide	" 28.4° C.	1,074.040
" "	" 40.4° C.	420.260
Strontium Carbonate	" 8.8° C.	121.760
" "	" 24.3° C.	91.468
Strontium Sulphate	" 16.1° C.	10.070
" "	" 26.1° C.	10.030

Fusibility of Mixtures of Salts.—H. Le Chatelier studies the fusibility of mixtures of salts capable of combining so as to form double salts. These mixtures correspond to the aqueous solutions of salts which form hydrates. Two salts which form together a single definite combination will have a curve of fusibility composed of three distinct branches, the one corresponding to the crystallization of one of the salts, the second to that of the other simple salt, and the third to that of the double salt. His results are shown in the form of a diagram.—Compt. Rend., 1894, 350, 415.

Melting Point of Inorganic Salts.—Victor Meyer has determined a number of salts by means of melting in a platinum crucible, stirring until solidification, and registering this temperature, which is stationary for some time, by means of a special air thermometer made of platinum. For sodium chloride he found 851° C.; sodium bromide, 727° C.; sodium iodide, 650° C.; caustic soda, 1098° C.; potassium chloride, 766° C.; potassium bromide, 715° C.; potassium iodide, 623° C.; caustic potash, 1045° C.—Ber. d. Chem. Ges., 1893, 2443.

Viscosity of Salts.—Dewar (Chem. and Drug., 1894, 836). A cylinder of stoutest steel having walls 3 inches thick was bored sufficiently to give a small well, ½ inch diameter, into which a piston might be driven; an aperture from the base of the well was continued through the cylinder, but its diameter was only $\frac{1}{16}$ inch—about that of a stout knitting-needle. The "viscosity," or otherwise, of the substances examined was determined by placing a small quantity of the material in fine powder beneath the piston, and putting on to the piston great pressure: if the substance was viscous, the effect of the pressure would be to squeeze through the fine aperture what was practically a rigid and fairly elastic wire. In several cases forcible ejection of the contents occurred with explosive violence and no wire would form. As the pressure employed sometimes reached 60 to 80 tons on the square inch, whilst the pressure of the largest Armstrong gun when fired does not exceed 16 to 18 tons per square inch, it may be imagined that these experiments are not without danger, and the professor said, small as were the apertures and thick as were the walls, he had yet managed to burst three of his cylinders. A long list of salts was given, and it was seen to be practically impossible to foretell as to which would be viscous and which non-viscous. KI, KBr, KCl, NH_4NO_3, NH_4Cl, NH_4CNS, Na_2SO_4 crystals, $FeSO_4$, KCy, $AgNO_3$, KHO, NaHO, $NaC_2H_3O_2$ exsic., alums, borax, and many others, are viscous and give these wires.

$(NH_4)_2SO_4$, Na_2CO_3 exsic., $NaC_2H_5O_2$ crystal, alum exsic., NaCl, $HgCl_2$ $MnSO_4$ are amongst the non-viscous salts. As a general rule organic substances are readily formed into wires—*e. g.*, sugars, starch, benzoic acid, and many others. Pure iodine also could be squeezed out into pliable wires yards long, but naphtalene resisted all pressure and obstinately exploded.

Estimation of Water in Hygroscopic Substances.—P. Jannasch and J. Locke.—Zeitsch. Anorgan. Chem., 1894, 174; Chem. Zeit., 1893 (Rep.), 93 (Illustration).

SOLUTIONS.

Solubility of Normal Substances.—H. Le Chatelier's formula leads to the conclusion that the normal curve of the solubility of a body will be the same in all solvents; but in reality the latent heat of the solution is not constant, and varies a little with the nature of the solvent. The general form of this curve is the following: It is comprised between two parallel asymptotes: the axis of the temperatures towards null temperatures, and the ordinate $S = \frac{L}{to}$ towards infinite temperatures.—Compt. Rend., cxviii., No. 12, Chem. News., 1894, 168.

Mutual Solubitity of Salts.—H. L. Chatelier. According to the author the determination of the mutual solubility of salts comprises three distinct cases: 1. The case where the two salts solidify together, forming isomorphous mixtures of variable composition. 2. The case where the two salts solidify separately. 3. The case where the two salts may form a definite compound. The author gives the results for the second case in the form of a diagram.—Compt. Rend., cxviii., No. 13.

How the Theory of Solutions Arose.—J. H. van't Hoff first shows how from a consideration of the relations between constitution and chemical properties, he was led to consider the rate of chemical actions, the equilibrium of opposed reactions, the thermo-dynamical basis of the equilibrium, and finally the general problem of affiinity. The first affinity problem he investigated was the simple one of the attraction of water by salts with water of crystallization, and while studying this subject he became acquainted with Pfeffer's osmotic researches. A thermo-dynamical consideration of the two phenomena jointly led to the conception of osmotic pressure in solutions as the analogue of gaseous pressure in gases, and enabled him to show how substances in dilute solution obeyed laws perfectly analogous to the ordinary gas laws, namely, those of Boyle, Charles, and Avogadro. He next deals with the theory of dilute solutions, and deduces from the osmotic pressure, (1) the lowering of the vapor pressure, (2) the elevation of the boiling point, and (3) the depression of the freezing point. The third section of his address is occupied with the deviations from the simple laws. First he discusses abnormally small freezing point depressions, then those that are abnormally large, and shows how the latter are accounted for by Arrhenius' hypothesis of electrolytic disassociation. Lastly, he calculates the amount of ionisation of pure water from experiments on the rate of catalysis of ethylic acetate, the minimum velocity predicted by the dissociation theory being experimentally verified.—Ber. d. Chem. Ges., 1894, 6.

Solutions.—E. J. Parry discusses the requirements necessary for the understanding of physical chemistry. He then gives the gist of Arrhenius' theory, the work of Clausius and some others.—Brit. and Col. Drug.; reprinted in Amer. Drug. and Pharm. Rec., 1893, 44.

Some Applications of Raoult's Law at the Boiling Point of Solutions.—A. P. Parizek and O. Sule. The molecular weights of several of the fatty acids and their etherial salts were determined from the boiling points of their solutions in benzene. In the case of the acids the molecular weight obtained increases with the concentration of the solution, and eventually approximates to double the ordinarily accepted value. The ethereal salts give normal values in dilute solutions, the agreement being closer the higher the boiling point of the salt in question.—Ber. d. Chem. Ges., xxvi., 1408–1412.

Changes at the Boundary Between Solutions of Different Concentration During the Passage of an Electric Current.—G. H. Zahn has investigated the phenomenon of the separation of precipitates at the boundary of electrolysis. The current was allowed to pass through two solutions of the same salt of different concentrations, from that of the greater to that of the less, a separation of the hydroxide of the metal then taking place at the boundary of the two solutions in certain cases. Such a separation was noticed with salts of magnesium, calcium, barium, strontium, aluminum, manganese, iron, zinc and copper, but not in the case of silver salts. In the latter case, however, as also with the salts of sodium and potassium, which form soluble hydroxides, the presence of the hydroxides at the boundary between the solutions could be rendered evident by the alkaline reaction of the solution with methyl orange at this point. The author is inclined to regard the above phenomena as evidence that water plays some part in the electrolysis of salt solutions.—Ann. Phys. Chem. [2], xlviii., 606–624; Jour. Chem. Soc. (Abs.), 1893.

GENERAL.

Asbestos—The Production and Uses of.—Amer. Jour. Pharm., 1893, 352; from Jour. Soc. of Arts; Jour. Chambre Com., Constantinople.

Boron-Eisen.—H. N. Warren describes a compound that is prepared by mixing solutions of borax and ferrous chloride, pressing the resulting white precipitate to free it from adhering water, and, after thoroughly drying, reducing it with an equivalent proportion of carbon in a plumbago crucible. In this way 4 to 5 per cent. of boron is said to enter into union with the iron, producing a compound which breaks with the fracture of metallic manganese and possesses sufficient hardness to readily scratch glass. It is with difficulty soluble in acids and its melting point is near that of cast iron. A more economical method of preparing the compound is to reduce ferric carbonate or oxide, mixed with boron oxide and charcoal. The average of several analyses is given as:

Iron	94.08	per cent.
Boron	4.02	"
Carbon (combined)	1.50	"
Phosphorus	0.09	"
Sulphur	0.31	"
Silicon and Manganese	traces.	

—Chem. News, 1893, 200.

Carborundum.—G. Deprez mentions certain artificial substances rivalling the hardness of the diamond. 1. Crystalline boron, obtained by a costly process. 2. Moissan's artificial diamond, which has not yet been produced in a practical manner. 3. The product obtained by Schützenberger in his researches on the compounds of carbon and silicon carborundum. It contains 70 per cent. of silicon and 30 per cent. of carbon. It is obtained by passing an electric current through a mixture of coke, sand and common salt. The process is conducted in a furnace.—Rev. Univ. des Mines et de la Metal., Jan., 1894.

Analysis of Carborundum.—Mulhaüser says, grind up repeatedly in an agate mortar, and elutriate. The material remaining in suspension in water after five minutes is taken for analysis. For C mix with $PbCrO_4$ alone, and subject to combustion. For Si mix with $KNaCO_3$ and fuse.—Zts. f. Angew. Chem., 1893, 637.

New Element.—K. J. Bayer reports (Chem. Zeit., 1893), of the discovery of a new element in French bauxite. Bayer says that the acid of the metal is a yellowish-brown infusible body, which dissolves in water to form an intense gold-yellow solution, and on neutralization with ammonia the color is changed to olive-green. The neutral solution gives the following precipitates: With barium chloride, greenish yellow; mercurous salts, bright straw color; silver nitrate, greenish; magnesia mixture, greenish crystalline precipitate, becoming yellow in acids; molybdic solutions, white on warming; sulphuretted hydrogen in alkaline solutions red color, in acid a brown oxysulphur salt of the metal, with precipitate of sulphur in violet solution. Potassium ferrocyanide, a very delicate reagent for vanadium and molybdenum, gives neither precipitate nor color. These interesting reactions seem to point to a compound of two heavy metals rather than a new element.—Chem. and Drug., 1893, 1074.

Emetics.—E. Maumené describes the "emetics" of silver, sodium, potassium (the ordinary tartar emetic), and lead. He concludes that in an acid, a salt, or in any compound whatever, water never plays a two-fold part—water of combination, water of crystallization; it is united in a single mass to the anhydrous substance in the proportions of the general law: $\frac{1}{1}$, $\frac{2}{7}$, $\frac{5}{3}$, $\frac{21}{11}$, $\frac{11}{5}$, $\frac{3}{1}$, $\frac{13}{3}$,.............$\frac{7}{1}$,or, inversely, as $\frac{7}{9}$, $\frac{3}{5}$...... It escapes at higher or lower temperatures according to these proportions. An anhydrous acid is that from which the maximum of water has been separated without causing it to lose its essential character. The remark of Berzelius of a constant relation between the oxygen of the bases is not exact, and cannot be admitted. With O 8.23 in the acid of the emetics, we may find O 0.92 in the salt of lithium, and O 4.037 in the ordinary potassium emetic. The composition of all bodies, without the slightest exception, is subject to the general law of the actions of mixture, and of no other.—Compt. rend., cxviii., No. 25.

The Emetics.—Paul Adam (Compt. rend., June 4, 1894). French chemists use the term "emetic" irrespective of physiological action, to include all compounds analogous in constitution to the well-known "tartar emetic." The theories put forward concerning the constitution of the emetics may be reduced to two: do antimonous hydrate, ferric hydrate and toxic acid act in these salts as acids or as bases? The classic formula corresponds to the second theory, whilst the researches of Jungfleisch favor the former and are supported by the present author. He concludes that the chemical analogies and reactions of "emetic," properly so called, should make us regard substances of this kind as ether salts and not as double salts.—Chem. News, 1894, 301.

On a Singular Case of Metallic Precipitation.—J. B. Sinderens. It results from the author's experiments that, at ordinary temperatures, lead precipitates lead from the neutral solutions of its nitrate, exactly as would do a plate of iron or of zinc. The same result is obtained if the lead employed is chemically pure.—Bull. Soc. Chim. de Paris, xi.–xii., No. 10.

Distilling Metals at Low Pressure.—Kahlbaum (Chem. Zeit., 1893) relates his experience with the purification of metals by distillation from glass retorts in vacuo. Out of the number thus far experimented with, including potassium, sodium, selenium, bismuth, etc., only tin and manganese had given trouble. With very pure mercury the pressure is but a minute fraction of one milligram. For selenium the boiling point is reduced from 660° to 200° C. (reduction = 460°) ; for tellurium, from 1390° to 450° C. (reduction = 940°) ; for cadmium, from 770° to 320° C. (reduction = 450°). In every instance the metal displayed the phenomena of dissociation, while the spectra of metals thus obtained compared with those of metals sold as chemically pure are notably different, containing in the case of cadmium, for instance, 9 lines less, and in that of tellurium 35 lines less than usually observed.—West. Drug., 1894, 18.

Oxides of the Alkali Metals.—Berzelius has stated the existence of an oxide of potassium having the formula K_4O, but other workers have failed to obtain it by his method (the action of a limited amount of air on the metal). The oxide, K_2O, is also described by Berzelius and by Gmelin. Of higher oxides, K_2O_2, K_2O_3, and K_2O_4 have been stated to exist by various workers. As the mode of the formation and the properties of these various bodies seemed somewhat uncertain, the whole work has been repeated and the results revised by W. Holt and W. E. Sims.—Journ. Chem. Soc., ccclxxix., 432.

Potassium.—It was found that perfectly pure and dry oxygen has no action on this metal, which may be distilled unchanged in it. By using moderately dry air, however, under favorable conditions, with the aid of a gentle heat, oxidation proceeds regularly and apparently without a break till the oxide, K_2O_4, is reached. This oxide, on exposure to moist air, deliquesces and gives off oxygen, and K_2O_2 results. As the reaction was quantitative, the tetroxide can be analyzed by measuring the oxygen liberated. The tetroxide is a bright, orange-yellow powder. No higher oxide can be formed, even when it is maintained for a long period at 200°–300° C. in a stream of oxygen. By the action of the theoretical quantity of nitrous oxide on potassium, K_2O_3 is formed. Exposure to air causes this oxide to pass into K_2O_4. K_2O could not be formed or isolated under any conditions, either by the action of oxygen or of the oxides of nitrogen.

Sodium.—The same results were obtained with pure, dry oxygen as in the case of potassium—the metal is unattacked. No suboxide, Na_4O, can be formed under any conditions. On passing moderately dry air over sodium, the latter melts and then burns, forming (unlike potassium) the monoxide Na_2O; further heating in a current of oxygen results in the formation of the yellowish-white peroxide, Na_2O_2, but no higher oxide can be formed.

Lithium readily forms the oxide, Li_2O; traces only of a peroxide could be obtained.

The general conclusions arrived at are that the most stable and definite oxides of the alkali metals are: K_2O_4, Na_2O_2, and Li_2O, while there also exist K_2O_2, K_2O_3, and Na_2O.—Chem. and Drug., June 23, 1894.

Promethium.—This is an alloy containing 60 per cent. of copper, 38 per cent. of zinc, and 2 per cent. of aluminum. These metals are melted together and sodium or other metallic flux capable of oxidation at the temperature of the mixture is stirred in. The quantity used should be sufficient to flood the surface of the mixed metals. The sodium increases the tenacity of the alloy and prevents deterioration by exposure to air or sea water. The degree of hardness may be varied by varying the proportions of the ingredients. The alloy is termed "promethium" or "titanic metal."—Pharm. Era, 1893, 298.

ANALYTICAL CHEMISTRY.

Analytical Chemistry of Recent Years—Certain Distinct Advances in the.—A. B. Prescott gives some important gains by the present generation of chemists: (1) The resolute attempt to find out the composition of matter as a whole in any and all of its mixtures of whatever source. (2) The elaboration of methods for the isolation of carbon compounds, both natural and artificial. (3) The studies of the molecular structure of bodies. (4) The employment of physical methods of inspection. (5) The reciprocal benefits of scientific research and of technical skill.—Pharm. Jour. Trans., 1894, 610; from Jour. Am. Chem. Soc., 1893.

Schemes for Qualitative Analysis.—J. S. C. Wells and A. R. Cushman give elaborate schemes with reactions for use in qualitative chemical analysis.—School of Mines Quart., 1894, 244.

Qualitative Analysis—Application of Electrolysis to.—C. A. Kohn has examined the applicability of electrolytic methods in the determination of antimony, mercury, lead, copper and cadmium. Also to the detection of metallic poisons in urine by means of electrolysis.—Pharm. Jour. Trans., 1893, 424; from Chem. News, 1893, 188. (See Electrolytic Separation.)

Quantitative Separation of Metals in an Alkaline Solution by Hydrogen Peroxide.—P. Jannasch and J. Leisinsky have separated lead from zinc and nickel and lead from nickel by means of hydrogen peroxide in solution of ammonia.—Ber. d. Chem. Ges. f. 1893; Chem. News, 1894, 20.

Quantitative Spectroscopic Analysis.—G. and H. Krüss compare the different methods and give an account of the influence of temperature upon the absorption-spectra of colored solutions.—Zeitschr. f. Anorg. Chem., 1893, 103.

Apparatus for Organic Analysis—New Forms of.—J. Leicester calls attention to and illustrates new forms of apparatus for drying gases in organic analysis and a new calcium chloride tube.—Chem. News, 1894, 130.

General Method of Chemical Synthesis.—R. Pictet has shown in a former paper that all chemical action ceases at temperatures below 130° C. It is, however, possible to produce chemical action in a mass cooled to this temperature by furnishing to it energy from the outside, in the form, for instance, of electric sparks. The quantities of energy supplied in this manner may be taken as equivalent to the endothermic phase of the reaction, and the heat lost by radiation to the surroundings as a measure of the exothermic phase. With the knowledge of these two quantities, the exact conditions necessary for effecting any particular chemical synthesis could be accurately ascertained and defined.—Compt. rend., 1893, 1057.

Separating Substances from Solvents.—An ingenious way of separating liquids and solids dissolved in alcohol, ether, etc., without evaporating the solvents, consists in cooling to 20°–25° C., saturating with carbon dioxide under pressure, and passing through charcoal or cellulose filters, which absorb the dissolved matters. The conditions of pressure are kept the same when saturating and filtering. The saturators and filters may be cooled with liquid carbon dioxide, and the carbon dioxide is diverted into the filter when the saturator is emptied, so as to maintain the pressure.—Chemical Trade Journal; Brit. and Col. Drug., 1894, 525.

Titration of Arsenic and Antimony.—Győry (Zeitsch. f. Anal. Chem., xxxii., 415) notes that the end-reaction with I solution (in presence of $NaHCO_3$) especially in the case of Sb (the As or Sb being, of course, triad) is slow. He proposes using a solution acidified with HCl, and containing KBr, adding a little methyl orange, and then titrating with standard $KBrO_3$. The end-reaction is when the solution becomes colorless.

Separation of Arsenic from Antimony.—L. Garnier (Jour. Pharm. Chim., 1893, 97). Dragendorff's method for separating these two metals in toxicological analysis consists in treating the mixed sulphides with ammonia, fusing the undissolved antimony sulphide, still containing some arsenous sulphide, with sodium nitrate, and dissolving any sodium arsenate which may have been formed with water, in which the sodium antimonate is practically insoluble. The author finds that ammonia always dissolves some antimony sulphide, together with the arsenous sulphide; he therefore recommends Ritter's method. This is performed by dissolving the mirror of arsenic and antimony obtained by Marsh's process in aqua regia and treating the solution with a mixture of tartaric acid, magnesium sulphate, ammonium chloride, and excess of ammonia. The arsenic is precipitated as ammonium magnesium arsenate, and the antimony is thrown down in the filtrate by hydrogen sulphide.

Volumetric Estimation of Calcium, Strontium and Barium.—The following process, based upon the property possessed by alkaline carbonates, of precipitating the oxides of the fourth group, occupies but a few minutes, and is, according to the author, Vizern, absolutely exact. The perfectly neutral solution of the salt to be estimated, to which a few drops of an alcoholic solution of phenolphthalein are added, is heated to near the boiling point, and then an alkali carbonate solution (53 Gm. sodium carbonate per litre) is added drop by drop, from a graduated burette, until a permanent rose-red tint is produced. Note the quantity used and calculate.

1 C.c. normal alkali solution = 0.02 Gm. calcium.
1 C.c. " " = 0.04375 Gm. strontium
1 C.c. " " = 0.0683 Gm. barium.

The process, however, cannot be applied if the liquid contains any other substance precipitable by the alkali carbonate. Following are some of the results obtained by the author:

	Estimation by Weight.	Volumetric Estimation.
Barium	1.244 Gm.	1.253 Gm.
Strontium	0.697 Gm.	0.7087 Gm.
Calcium	0.638 Gm.	0.642 Gm.

—Jour. Pharm. Chim., 1893, 442.

Separation of Barium, Strontium and Calcium.—Fresenius (Zeitsch. Anal. Chem., 1893, 312). In qualitative analysis, if baryta, strontia, and lime are separated from magnesia, the three former are obtained as carbonates. After washing they are dissolved in dilute nitric acid, the solution evaporated to dryness in a small porcelain capsule, and heated for ten to fifteen minutes very strongly on an iron plate (the temperature may be safely allowed to rise to 180°) until the residue no longer smells of nitric acid, and until a cold glass plate, placed as a cover over the capsule for a few seconds, is no longer bedewed with water-drops. The contents of the capsule, when cold, are immediately ground up, first dry, and then, with the addition of 5 to 10 C.c. of a mixture of equal volumes of ether and absolute alcohol. After a few minutes the solution is filtered off, and the residue washed four times with small quantities of the mixture of ether and alcohol. In the residue are the barium and strontium nitrates, to which small portions of calcium nitrate may still adhere; and in the filtrate, the calcium nitrate, in which, without due care in working, demonstrable traces of strontium may be present. To the ether-alcoholic solution there are now added 2 drops of dilute sulphuric acid. If there appears any appreciable precipitate it can only be calcium sulphate, and there can be no occasion to test further for calcium. If the precipitate is very slight it may be due to traces of strontium, which have possibly passed into the ether-alcoholic solution. In this case the solution is mixed with 4 C.c. of water, the ether and alcohol evaporated, a few drops of ammonia added, and about 1 Gm. of ammonium sulphate; heat to ebullition, filter through a small filter, add to the filtrate a drop of acetic acid, so that it just reddens litmus paper, and then a few drops of ammonium oxalate. If lime is present there appears at once (or in case of small quantities, after standing) a precipitate of calcium oxalate. It cannot be mistaken for the minute quantities of strontia possibly present, because the traces of strontium sulphate, which dissolve in a concentrated solution of ammonium sulphate, are not precipitated by ammonium oxalate in presence of a trace of free acetic acid.

The barium and strontium nitrates are dissolved with heat in about 100 C.c. of water, filtered if necessary, acidulated with 3 to 4 drops of acetic acid, heated to ebullition, gradually adding neutral potassium chromate until the solution has a yellow color, and allowed to boil again. If the odor of acetic acid is still observed a little more potassium chromate is added. If barium is present there appears at once (or in case of very small quantities after a short time) a light yellow precipitate. The liquid is allowed to stand for an hour, filtered, and to a portion of the filtrate there is added ammonia, and then ammonium carbonate. If there appears any appreciable precipitate, it can be nothing but strontium carbonate, and there is no need to test further for strontium. If there is no precipitate, or merely one extremely slight, add to the bulk of the filtrate 1 or 2 drops of nitric acid, concentrate to from 10 to 20 C.c., and add then ammonia and ammonium carbonate. If still no precipitate is formed, strontium is not present, but if a slight precipitate appears it may be strontia, or possibly traces of lime. The small precipitate is filtered off, washed, dissolved in a few drops of dilute hydrochloric acid, and the solution is evaporated to dryness. The slight residue of the neutral chlorides is dissolved in 1 or 2 C.c. of a mixture of 3 parts of water and 1 part of alcohol, which is kept in readiness, 1 drop of the solution of yellow potassium chromate is added, and the liquid is heated to incipient ebullition. If strontium is present it separates out at once (or after standing in heat for a short time) as a finely pulverulent yellow precipitate of strontium chromate.

For the quantitative separation of barium, strontium and calcium, the following considerations are decisive:

1. For the accurate separation of barium, strontium and calcium, only two methods have been found quite suitable, *i. e.*, the separation of the barium as chromate or as silico-fluoride.

2. The separation of strontium from calcium suceeeds only by treating the nitrates with ether-alcohol. This treatment is also suitable for separating barium from calcium.

3. A liquid in which hydrosilico-fluoric acid is present along with strontium and calcium is not well suited for determining the two alkaline earths, since they can then be thrown down only as sulphates, consequently in a state in which they are not directly separable.

To effect the purpose the following proceedings are essential:

(*a*) Barium and strontium are separated from calcium by treating the nitrates with ether-alcohol, and from the solution of the former the barium is separated as chromate.

(*b*) The barium is separated in the first place as chromate. The strontium and calcium are converted first into carbonates and then into nitrates, which are separated by ether-alcohol.

Both these methods yield satisfactory results, and the one or the other will be found preferable according to circumstances.

Separation of Strontia from Lime.—Fresenius (Zeitschr. f. Anal. Chem., xxxii., 189). The following methods were examined:

Stromeyer's as Modified by H. Rose.—Dissolving $Ca(NO_3)_2$ from a mixture of the dried nitrates by a mixture of absolute alcohol and ether (equal volumes). One part dry $Sr(NO_3)_2$ was found to be soluble in 83.044 parts ether-alcohol. One part dry $Ca(NO_3)_2$ was found to be soluble in 1.87 parts ether-alcohol. The method proved the best of those tried. Nevertheless, small amounts of Sr remained with the $Ca(NO_3)_2$, and small amounts of Ca with the $Sr(NO_3)_2$.

Rose's.—Treatment of the sulphates with $(NH_4)_2SO_4$ solution (1 : 4). The respective solubilities of the sulphates in $(NH_4)_2SO_4$ of this strength were: $CaSO_4$ 1 part in 287 parts—$SrSO_4$ 1 part in 16.949 parts. CaC_2O_4 was found to be not insoluble in $(NH_4)_2SO_4$. The separation was incomplete.

Fleischer's.—Five-minute boiling of mixed oxalates with K_2SO_4. The theory of this method is that CaC_2O_4 is unchanged, whereas SrC_2O_4 interchanges and affords K_2CO_4 and $SrSO_4$. Experiments showed that the CaC_2O_4 was not entirely unaffected, and, moreover, that the alteration of the Sr combination was not entirely complete, hence inexact results.

Sidersky's.—Simultaneous action of $(NH_4)_2SO_4$ and $(NH_4)_2C_2O_4$ in a neutral solution. The supposition was that $SrSO_4$ and CaC_2O_4 would precipitate simultaneously, and could afterward be separated by treatment with HCl. The separation was found to be unsatisfactory for various reasons: proportions of salts present, solubility of $SrSO_4$ in HCl, etc.

Determining Barium in the Presence of Calcium and Magnesium.—Barium chloride is soluble in pure concentrated hydrochloric acid only to the extent of one part in 20,000. If ether be added, the solubility is decreased to one part in 120,000. This is taken advantage of by F. W. Mar as forming a means of determination when calcium and magnesium are present. The chlorides of the metals are dissolved in the least possible quantity of boiling water, then 25 C.c. of pure concentrated acid added, and, after the liquid has cooled, 5 C.c. of ether. If the acid is added slowly, drop by drop, allowing the precipitate to re-dissolve as long as possible, when obtained it is coarsely crystalline and easy to manipulate. After standing it is collected upon a filter, washed with hydrochloric acid containing 10 per cent. ether, dried and weighed. The method is said to be very accurate, and the author obtained some very good results in some trial experiments.—West. Drug., 1894, 99; from Pharm. Jour. Trans., 1893.

Separating Cadmium from Copper.—Browning (Amer. Jour. Sci., xlvi., 280). The metals being in the form of sulphates, KI in slight excess is added, and the solution is then evaporated to dryness to expel free I. On taking up with water Cu_2I_2 remains insoluble, and may be filtered off through asbestos, dried 120 to 150° C. and weighed. In the filtrate Cd may be precipitated by Na_2CO_3, ignited to CdO and weighed. In presence of KI, H_2S gives precipitates of Cd that cannot conveniently be filtered.

Weyl's Method for Cu, Fe, Sb, and Zn Powder.—Jean (Bull. Soc. Chim. [3], ix., 256). The author's method of managing this process is described. It depends on the decolorizing effect of $SnCl_2$ on solutions of $CuCl_2$ or Fe_2Cl_6. The operation is performed in a flask, the contents of which are strongly acidified with HCl, and kept boiling during the titration that the flask may be filled with HCl vapors. The standard $SnCl_2$ solution is made by dissolving 4.5 to 5 Gm. each in 500 C.c. of water containing HCl, which is standardized by a solution of crystallized $CuSO_4$ containing 0.1 Gm. Cu in 10 C.c., strongly acidified with HCl for titration. When both Cu and Fe are present, the two are titrated together, then Cu is precipitated out with metallic Zn, and after oxidizing Fe by permanganate, the Fe_2Cl_6 is titrated alone (Cu standard × $0.88238 = Fe$.) If $CuCl_2$ in known quantity is added to a solution of $SbCl_3$, titration gives Cu and Sb. On deducting the amount due to Cu, the remainder is due to Sb (Cu standard × $0.96214 = Sb$.) Zinc powder (putty powder) may be dissolved in a measured quantity of $CuCl_2$ solution. On filtering off Cu, the Cu remaining in solution may be titrated after acidifying with HCl, etc. (Cu standard × $1.0236 = Zn$).

Separating Cobalt and Nickel.—Herrenschmidt and Capelle. The nitrite separation was found by these authors to be unsatisfactory and incomplete; the cyanide method was better, but not altogether satisfactory. The method they regarded as more complete consists in suspending the hydroxides in soda lye and warming to 50° C. while passing a current of Cl. Ni goes into solution while Co remains undissolved. The method recommended, after removing H_2S, and separating Fe and Al by repeated precipitations with $(NH_4)_2CO_3$, is to add $(NH_4)_2S$. Let stand, acidify with $HC_2H_3O_2$, boil, filter, wash with $NH_4C_2H_3O_2$ solution, dissolve in HNO_3 and divide the solution in halves. One-half is evaporated to dryness, the residue moistened with H_2SO_4, and the Co and Ni together weighed as sulphate ($ZnSO_4$ might also be present). The second half is precipitated by KCy and Br, as recommended by Fresenius, and the $Ni_2(OH)_6$ treated with NaOH and Cl, as suggested above. The solution of Ni is acidulated with HCl, and, after boiling out Cl, is poured into NaOH solution. This is redissolved in HCl and evaporated to dryness, finally moistened with H_2SO_4 and weighed as sulphate. The Co is obtained by difference. If Zn is present, the salts from the first half are dissolved, and the Zn separated by Wöhler's KCy method, after which it may be estimated.—Zeitschr. f. Anal. Chem., 1893, 607.

Separation and Estimation of Halogens. — Friedheim and Meyer (Zeitschr. f. Anorg. Chem., 1893, 407). Introduce the solution into a retort and add KH_2AsO_4 and dilute H_2SO_4. I separates and may be distilled by the aid of steam into solution of KI, in which it is titrated by standard $Na_2S_2O_3$. The contents of the retort are cooled and conc. solution of $K_2Cr_2O_7$ added. Then on heating, Br is evolved, which is caught in a KI solution, and titration is again made with standard $Na_2S_2O_3$. The contents of the retort are acidified with HNO_3 and the Cl present determined gravimetrically by $AgNO_3$. Gooch and Browning (Am. Jour. Sci., xlv., April, 1893), criticise this method as less rapid and convenient than their own (vid. Am. Jour. Sci., xxxix., 188).

Iodine in Presence of Bromine and Chlorine.—Gröger (Zeitschr. f. Angew. Chem., 1894, p. 52). Weigh out, dissolve to a definite volume, and take a measured portion, not containing more than 0.050 Gm. of I, render neutral or slightly alkaline, place in a flask on the boiling water-bath, and run in solution of potassium permanganate (1 in 25) until the pink color is permanent. The reaction occurring is: $KI + K_2Mn_2O_8 + H_2O = KIO_3 + 2KOH + 2MnO_2$. No corresponding action occurs with bromide or chloride under these conditions; add a few drops of alcohol, and heat until colorless. Filter off MnO_2 and wash well, and to the cold filtrate add a solution containing about 0.5 Gm. KI free from iodate, and acidify with HCl. The reaction occurring is $KIO_3 + 5KI + 6HCl = 6KCl + 3H_2O + 3I_2$. Titrate with tenth normal $Na_2S_2O_3$. One-sixth of the I thus found has come from the substance tested. If ammonium is present in the original substance it must be removed by adding excess of KOH free from nitrite and heating, before adding the $K_2Mn_2O_8$, otherwise it would form nitrite in the solution and occasion high results. The solution should not be too strongly alkaline when permanganate is added, or a partial reduction (formation of green manganate) will occur. The method may be applied for determining the purity of sublimed iodine.

To Separate Iodine from Chlorine and Bromine.—D. S. McNair (Chem. News, 1893) proposes a method based on the fact that when silver iodide is treated with potassium dichromate and concentrated sulphuric acid, it is completely converted into silver iodate; whereas silver chloride and bromide are converted into sulphate. Two portions of a solution containing the three halogens are precipitated with silver nitrate; the one precipitate is weighed, the other is heated with the oxidizing mixture and the resulting iodate is then reduced by means of sulphurous acid, and the iodide is filtered off and weighed. The silver, originally present as chloride and bromide, contained in the filtrate from the iodide, is precipitated and weighed as chloride. The method affords very accurate results, it is claimed. The author also used, instead of paper, a Gooch crucible asbestos filter, which he found advantageous both as regards speed and accuracy, as it is not necessary to use two portions of the liquid when the chlorine and bromine are to be determined; the precipitate of the mixed haloids may be dried [49° C], weighed, and then treated with sulphuric acid and potassium dichromate as usual, along with the asbestos previously used in filtering. When the oxidation is finished, the solution is diluted and sulphurous acid is added at once, without previously filtering off the asbestos, which is collected along with the silver iodide. The weight of the asbestos used in the first filtration is necessarily deducted from that of the silver iodide. It is evident that this asbestos might be removed by filtering before adding sulphurous acid; but this is not recommended, as silver iodate is apt to separate out during the filtration, and unless this be completely re-dissolved before the addition of sulphurous acid, it will escape reduction and the results will be unreliable.

Alkalinity of Liquids Containing Chlorine.—Ullmann (Chem. Zeit., xvii., 1208) finds that succinic acid decomposes hypochlorites (and carbonates) but not chlorides. If, therefore, a known amount (excess) of succinic acid is added, and the solution boiled, it may be titrated back with standard alkali, using phenolphthalein as indicator. A determination of available chlorine (and consequently of HClO) gives a basis for calculation of the alkalinity. [The result in case chlorate is present is not stated.—*Reporter.*]

Detection of Iodates in Alkaline Iodides.—Matteo Spica (Gazz. Chim. Ital.) proposes to utilize the fact that while barium iodate requires 1736 parts of water to dissolve it at 150° C., barium iodide is very soluble in water or salt solution. Dissolve 1 Gm. of potassium iodide in 5 C.c. of water and add a small quantity of barium chloride solution. If as little as 0.002 per cent. of iodate be present, a granular precipitate will be thrown down which is insoluble in ten times the original volume of water, and is also insoluble in diluted acetic or hydrochloric acid, but which dissolves on the addition of concentrated sulphuric acid if warmed. If the precipitate dissolves in acetic acid with effervescence, the presence of a carbonate is indicated. If an insoluble precipitate remains after treatment with acetic acid in the cold, the addition of warm acetic acid will disclose whether or not it is an iodate or a sulphate. This one test, therefore, answers for all three impurities. It has the advantage over the tests laid down in the Pharmacopœia that it is less liable to error through decomposition or impurity of the reagents.

Estimating Chlorates, Nitrates and Nitrites.—Roberts says: Boiling a solution of nitrate (acidified with HCl) with $MnCl_2$ affords Cl which when passed into KI solution may be estimated. The NO evolved may also be measured over NaOH solution. $FeCl_2$ with measurement of the NO may also be used. Solution of chlorate also gives a proportional evolution of Cl, which may be passed into KI and estimated by titration with standard thio-sulphate. In a mixture of nitrate and chlorate, both may be determined in one operation with $MnCl_2$ by measuring the NO evolved. Then on titrating the I set free, and allowing for the amount attributable to the nitrate, the remainder is due to the chlorate present. If a mixture of nitrate and nitrite is tested, a calculation from the I set free and the NO obtained will afford a means for calculating the proportion of each present. A special form of apparatus is recommended, in which all the air present must be driven out by CO_2, before beginning the operation, a precaution especially necessary when nitrite is present. The results are fair in case nitrite is present.—Am. Jour. Sci., Sept., 1893.

Separating Lead and Copper.—Jannasch and Lesinsky (Ber. d. Chem. Ges., xxvi., 2331). The solution of the metals in HNO_3, in a bulk of about 60 C. c., is mixed in the cold with 60 C.c. of (at least 2 per cent.) H_2O_2 solution, and excess of ammonia. After adding 50 C.c. of saturated solution of $(NH_4)_2CO_3$ the PbO_2 (hydrated) is filtered off and washed, first with ammoniacal H_2O_2 solution, afterward with ammonia only. There is some tendency for the Cu to remain in the precipitate. The PbO_2 is converted first to nitrate then to PbO, in which form it is weighed.

The Cu in the filtrate is separated by H_2S, ignited, and finally weighed as CuO, fumes of $(NH_4)_2CO_3$ being brought in contact with it in such a way as to remove all sulphate.

A large excess of H_2O_2 gives with Pb salts white nacreous leaflets completely insoluble in water and ammonia. It may be separated in a similar manner from Zn and from Ni.

Separating Lead and Silver.—Jannasch (Ber. d. Chem. Ges., 1893, 1496.) Dissolve about 0.5 Gm. of the mixed salts in 50 C.c. of water; add 2 C.c. strong HNO_3, and then precipitate PbO_2 by adding 15 to 20 C.c. of 2 per cent. H_2O_2 solution with 15 C.c. conc. ammonia, afterward adding 5 C.c. of a cold saturated solution of $(NH_4)_2CO_3$. Stir 10 minutes, filter, washing at first with ammoniacal water, finally with clear water. The operations must be conducted in the cold. Convert the PbO_2 to sulphate and weigh. In the ammoniacal filtrate the silver can be determined by evaporating off the excess of ammonia, acidifying with HNO_3, and then precipitating with HCl.

Bi can be separated from Ag in a similar manner. Ag may also be separated from Pb by precipitating both as chromates, adding ammonia and digesting a short time on the water-bath. Ag_2CrO_4 is completely dissolved, leaving $PbCrO_4$. Filter, and wash first with dilute ammonia, finally with water only.

Separation of Lead and Tin.—Jannasch and Remmler (Ber. d. Chem. Ges., 1893, 1422). The metals were precipitated together as sulphides, which, after washing and drying, were heated in a current of Br. $SnBr_4$ was readily volatized, by repeated evaporation with HNO_3, converted to oxide, and then ignited and weighed. Converting the metals into sulphides by fusion with S was successful as a mode of shortening the manipulation in many cases. Some difficulty was experienced in completely sulphurizing metallic tin if in coarse pieces. The addition of 10 to 15 per cent. of iodine with the S, gave excellent results in sulphurizing either tin or antimony.

Determining Organic Matter.—Heidenhain (Jour. Am. Chem. Soc., xv., 71), proposes a slight modification of Hehner's method—boiling with concentrated H_2SO_4 and $K_2Cr_2O_7$, and subsequently determining the residual CrO_3 by standard $FeSO_4$ solution. The proportions used are 25 C.c. of the solution of the substance, 30 C.c., fifth normal $K_2Cr_2O_7$, and 33 C.c. conc. H_2SO_4. The operation is conducted in a large flask, in the neck of which is hung a U tube, through which water circulates, to act as a reversed condenser. The method is not universally applicable. The degree of dilution specified reduces the independent reaction between H_2SO_4 and $K_2Cr_2O_7$ to a minimum.

Determining Sulphide Sulphur.—Marchlewski (Zeitschr. f. Anal. Chem., xxxii., 403), Continuation of Examination of Methods (*vide* Quarterly, xiv., 163). Gröger-Treadwell's method consists in heating pyrites, etc., with metallic iron to obtain monosulphide, then treating with HCl, and passing the evolved H_2S into iodine solution, and titrating back the excess of I. The method is unsuitable for the examination of pyrites, since a part of the sulphates (frequently present) are also estimated by this process. The S in $PbSO_4$ was only partially obtained by application of this process.

Sauer's Method.—Combustion in a stream of O, passing the gases into a KOH solution of Br, heating and precipitating by $BaCl_2$, is rather elaborate and tedious.

Fohr's Method.—Passing the evolved H_2S into ammoniacal zinc solution, adding $Fe_2(SO_4)_3$, and titrating with permanganate, gave irregular results.

Klobukow's method, presumed to be applicable for the determination of S in the higher sulphides, and also in sulphites, hyposulphites, etc., proved unsatisfactory. It consists in mixing the substance with zinc dust, adding acid, and heating, when the S is presumably all converted to H_2S, which is caught and determined iodometrically.

Action of Zinc and Magnesium upon Metallic Solutions, and the Determination of Potassium.—A. Villiers and F. Borg, in determining potassium, claim that the following method is very rapid and very accurate: The double chloride, obtained in the ordinary manner, is washed with a mixture of equal volumes of alcohol and anhydrous ether, in the capsule in which it has been produced, until the filtrate runs through absolutely colorless—a result obtained with a small volume of the mixture. The residual salt is dissolved in boiling water, collecting the solution in a conical vessel. Add to it a little pure hydrochloric acid, and introduce gradually fragments of magnesium until the liquor is completely decolorized and the magnesium dissolves without its surface becoming tarnished.

The platinum thus deposited is very easy to wash, and does not adhere to the sides of the capsule. It is brought upon a filter without folds; the filter, after desiccation, is incinerated and the platinum is ignited. Its weight, multiplied by 0.3939 or by 0.4747, gives the corresponding weight of potassium or potassa.

This method is very advantageous in the determination of potassa in presence of soda and other substances, except ammoniacal salts. It is sufficient to substitute this method of liberating the platinum for that proposed by Corenwinder and Contamine in their method for the determination of potassa in mixtures, such as salines or refined potash.

By the use of magnesium the authors have obtained exactly 100 per cent. of the potassa contained in potassium sulphate mixed with large quantities of sodium phosphate and sulphate, calcium, magnesium, and iron chloride, and aluminum sulphate, if for precipitating and washing the chloroplatinate a mixture of equal volumes of anhydrous alcohol and ether was employed. In presence of bromides, the precipitate produced by platinum chloride may contain more or less bromine replacing an equivalent quantity of chlorine. Still, a determination of the weight of the platinum will give in this case an exact result.

It must not be overlooked to transform the potassium salts into chloride if the acids are volatile, or, in the contrary case, to acidulate with hydrochloric acid.—Bull. Soc. Chim. Paris, Series 3, ix. and x., p. 602, through Chem. News, 1893, 264.

Agitator for Precipitation of Phosphomolybdate, etc.—Textor (Jour. Anal. App Chem., vii., 279) describes a device connected with a Richard's pump, for agitating by passing a current of air through the solution.

Electrolytic Methods.—Oettel (Chem. Ztg., xvii., 173) asserts that in the account of electrolytic methods a very important factor is usually omitted, viz.: the number of amperes per unit of area of the electrode. The shape and disposition of the cathode have, of course, some influence, and should be noted. A statement of the strength of the current, in C.c. of gas given off, is less satisfactory than statement in amperes. Voltage is regarded as of less importance.

Electrolytic Separations.—E. F. Smith and J. B. Moyer (Jour. Anal. App. Chem., 1893, 252). In HNO_3 solution Hg and Pb were separated perfectly when much HNO_3 was present ; imperfectly, when the free acid was less.

When Bi was present with both the above metals in HNO_3 solution, no matter what the other conditions, Bi was deposited both on the cathode with the Hg and on the anode with the PbO_2. Separations of Ag from Pb, Cu from Cd and from various metals of the $(NH_4)_2S$ group, were easily accomplished in HNO_3 solution. Also Bi from Cd, or from metals of the $(NH_4)_2S$ group when only one was present. When two or more were present, a complete separation was difficult in HNO_3.

Electrolytic Separations.—Schmucker (Jour. Am. Chem. Soc., xv., 195). In ammoniacal tartrate solution containing tin as stannate, a perfect separation of Cu could be effected. Cu was also satisfactorily separated from a solution containing As, Sb, and Sn under the same conditions—highest oxidation and presence of ammoniacal tartrate. Cd and Bi were separated from those elements under the same conditions, provided the current was weak and sufficient time was allowed. Hg was also completely separable under the same conditions as Cu.

——— Vortmann (Monatsh. f. Chem., xiv., 536). The apparatus is figured and described. Alkaline solutions are used. Zn is readily precipitated from NaOH and Rochelle salt solution on a silvered copper dish. Strength of current per 10 $Cm.^2$, 0.3 to 0.6 ampere. Fe separates well as an adherent coating to Pt or Ag in an alkaline tartrate solution containing free alkali. The coat contains only minute amounts of C after long action.

Co requires the presence of KI. The NaOH must be so strong that the solution is blue in the cold. The anode is always coated with an adherent slime, which contains traces of Co.

Ni is precipitated under conditions similar to Fe with a moderately strong current.

To separate Zn in presence of Ni, add Rochelle salt and conc. NaOH, and then electrolyze. Fe in presence of Ni in a similar manner, but not quite so satisfactorily. Co may be separated from Ni.

To separate Fe and Zn add tartrate, render alkaline, and electrolyze in Pb, which affords the Fe (with traces of Zn), then transfer to a silvered dish, and precipitate Zn. For complete separation re-dissolve the Fe, and repeat. Or else use an alkaline solution containing KCy, from which Zn is precipitated, and Fe remains as K_4FeCy_6. To separate Co and Ni from Fe, oxidize with Br water, add $(NH)_2SO_4$ and ammonia, and electrolyze. The $Fe_2(OH)_6$ may remain suspended in the solution.

To separate Cu in presence of much Fe, oxidize with HNO_3, and conduct the operation as in the separation of Ni and Co.

Electrolytic Separation of Copper and Antimony.—Smith and Wallace (Jour. Anal. and App. Chem., vii, 189). On converting the antimony to antimonate, adding tartaric acid, and then rendering ammoniacal, copper only was precipitated by the current.

Electrolytic Separation of Mercury from Bismuth.—Smith and Moyer (Jour. Anal. and App. Chem., vii, 185). Perfect separation of these metals in HNO_3 solution was found to be impossible.

Electrolytic Separation of Lead from Copper.—Nissenson (Zeitschr. f. angew. Chem., 1893, 646). The separation can be completely effected if proper conditions as to strength of current and amount of acid are established: 1 Gm. of the ore is dissolved in 30 C.c. HNO_3 (S. G. 1.4) diluted to 180 C.c. and then electrolyzed, beginning with a current of 0.5 ampere, and after an hour increasing to 1.5 to 2 amperes. The separation is complete in 6 to 7 hours.

——— Classen (Ber. d. Chem. Ges., 1894, 163). The solution (75 C.c.), containing 20 C.c. of HNO_3 (sp. gr., 1.35 to 1.38), is electrolyzed hot (50 to 60° C.), with a current of 1.1 to 1.2 amperes (ND_{100} 1.5 to 1.7) for an hour. By this means 98 to 99 per cent. of the lead is deposited on the anode as PbO_2, while no Cu is deposited on the cathode. The solution, transferred to another weighed dish, is then over-neutralized with ammonia (until the blue color appears), and 5 C.c. of nitric acid is added, and it is diluted to 120 to 150 C.c. After standing until it becomes perfectly cold, it is electrolyzed for 3 or 4 hours with a current of ND_{100} 1 to 1.2 amperes. In this the remainder of the Pb is deposited on the anode, while the Cu separates on the cathode.

$PbSO_4$, if present in the liquid to be analyzed, can be brought into solution sufficiently for the purposes of the first deposition by treating with a little ammonia, and then pouring the mixture into the 20 C.c. of hot HNO_3 in the capsule.

Qualitative Analysis by Electrolysis.—Kohn (Chem. News, 1893, 188). The paper may be summarized as follows:

Element.	Solution used.	Current per min.	Delicacy 1 part in
Sb..........	K_2S	1.5 to 2 C.c.	1½ million.
Hg.........	HNO_3	4 to 5 C.c.	"
Pb..........	HNO_3 10 to 20 per cent.	2 to 3 C.c.	"
Cu..........	......	....	3 million.
Cd..........	KCy or $K_2C_2O_4$	0.2 C.c.	1½ million.

The tests are much more delicate than with H_2S. In testing urine or other organic liquids twice as much time must be allowed as when the solutions contain only mineral salts alone. For lead in organic solutions, the addition of $(NH_4)_2C_2O_4$ is necessary.

ALKALIMETRY AND ACIDIMETRY.

Proposals for Standardizing in Acidimetry and Alkalimetry.—E. Breutel (Oest. Chem. Ges. and Zeit. Anorg. Chem.) recommends potassium dichromate as the starting point for acidimetry. It is heated to fusion, weighed when cold, and the titration is effected with baryta water, using phenolphthalein as indicator. E. Kimbach, in the course of his studies on the atomic weight of boron, has satisfied himself that the soda in borax can be very sharply titrated with hydrochloric acid, using methyl orange as indicator. As borax can be obtained sufficiently pure for ordinary purposes by re-crystallization and exposure to the air, he proposes to use it instead of sodium carbonate for determining acids. One Gm. of crystalline borax weighed in air with brass weights corresponds to 5.2391 C.c. normal acid. Hence 1 litre normal acid equals 190.872 Gm. borax. Th. Salzer (Ber. d. Chem. Ges.) states that he made the same proposal some time ago, and it is consequently found in the second edition of "Mohr's Text Book of the Volumetric Method." In a second paper (Pharm. Centralhalle) Salzer discusses the question what indicator should be selected when using borax, and shows that the methyl orange preferred by Joly and Rimbach is preferable to litmus only in concentrated solutions, but that it is less sensitive in dilute liquids. The author recommends the use of a decinormal solution, with litmus as indicator, titrating from an onion-red to a bluish-red. M. Weinig (Zeit. Angew. Chem.,) recommends, whilst considering the gravimetric standardizing of sulphuric acid, besides precipitation with barium chloride and standardizing with sodium carbonate, the two following methods: 1. Of two equal portions of sulphuric acid, the one is titrated with baryta water and into the other is distilled ammonia evolved from a solution of ammonium chloride of known strength, the residue of the sulphuric acid being again titrated with baryta water. The standard of the sulphuric acid may be calculated from the result. 2. The method recommended by Schaffgotsch for the determination of nitric acid, *i. e.*, evaporation with an excess of ammonia, is also applicable for sulphuric acid. A known quantity of sulphuric acid is put in a platinum capsule along with a slight excess of ammonia (about 0.5 C.c. were then requisite for neutralization), evaporated to dryness, dried for half an hour at from 115° to 120° and weighed. This proposal has been tested by H. Eckenrote (Pharm. Zeitung) and found very convenient, as also for hydrochloric and oxalic acids.—Chem. News, 1894, 101.

Borax as a Basis for Acidimetry.—T. Salzer suggested the use of borax as a standard alkali in 1857, but the impossibility of obtaining solutions of normal strength operated against its adoption at the time. It is, however, far preferable to work with weak solutions since the tendency of boric acid to redden litmus disappears on dilution. Methyl-orange may be used as indicator in the titration of mineral acids, but in dilute solutions is far less sensitive than litmus: for organic acids it is inadmissible. The borax used must be free from octahedral crystals; it should lose 47.1 per cent. of water when ignited. A decinormal solution (19.0872 Gm. per litre) is of convenient strength, and acids must be diluted to a strength not exceeding

N 10 before titration. The acid is to be colored a pale yellowish-red with sensitive litmus tincture, and the borax solution run into it until the color just changes to a bluish-red, and no longer returns to yellowish-red on stirring. Mineral acids, oxalic, acetic, and tartaric acids give satisfactory results; phosphoric acid behaves like a monobasic acid. These acids give practically the same results when the acid is run into the borax as when the process is reversed. Citric acid can equally well be titrated by the borax solution, but when the citric acid is run into the borax, more acid is consumed, seemingly from formation of boro-citric acid.—Zeitschr. f. Anal. Chem., 1893, 529.

Standardizing Alkalimetric Solutions.—Neitzel (Ibid., xxxii. 422), revives the proposition of Hartley—the use of metallic sodium. The metal must be weighed under petroleum, and then oxidized by the use of strong alcohol.

Indicators in Sulphide Titrations.—Williams (Chem. News, 1893, 236). Nitro-prusside indicates 0.0000982 Gm. of Na_2S in 1 C.c. of water, while lead acetate in NaOH indicates 0.0000245 Gm. of Na_2S in 1 C.c.

Phenolphthalein as an Indicator.—R. T. Thomson has found that boric acid may be accurately titrated with standard solution of sodium hydroxide, using phenolphthalein as indicator, but it is necessary to add to the liquid about one-third of its bulk of glycerol. The amount of boric acid contained in borax may be estimated in the same manner, after first adding sufficient sulphuric acid to combine with the soda, methyl-orange serving as indicator. The excellent results obtained by the author are probably due to the greater viscosity of the liquid, caused by introducing the glycerol.—Jour. Soc. Chem., Ind., 1893, 432.

Phenolphthalein and Methyl Orange as Indicators.—Breed (Jour. Anal. and App. Chem., vii., 204). Small amounts of CO_2 remain in solutions, rendering results with phenolphthalein as indicator incorrect, unless boiled for fully ten minutes. Methyl orange is preferable. In the discussion, attack of the glass is suggested by Haines as having an influence. The sensitiveness of phenolphthalein is five times as great as that of methyl orange. Phenacetolin was found good, if the alcoholic solution was not filtered. Good methyl orange was difficult to obtain. Pemberton found variations in results might be due to the presence of Al_2O_3 in the standard alkali. Keiser found methyl orange to be more sensitive than phenolphthalein.

Potassium Chromate as an Indicator.—W. G. Young, in Analyst, 1893, 125. Titrations with silver nitrate, using potassium chromate as an indicator, are said not to be accurate, because silver chromate is to some extent soluble in water. W. G. Young gives all particulars of his investigation. Sodium chloride was the chloride used, and potassium chromate the indicator. The following are the general results obtained: Silver chromate is soluble in water to the extent of 6 parts in 100,000 of water at 15.5° C., and more soluble in hot water. Titration should never take place with hot solutions, and even in the cold the bulk of the solution should be reduced as low as possible. The importance of the observations may be judged from the fact that the error in estimating chlorine in water may amount to 31 per cent., if proper precautions are not taken.

Sensitive Tincture of Litmus.—Prepared according to Boll. Chim. Farm., 1893, 298, (through Rép. de Pharm., 1893. 319) by exhausting the litmus with hot distilled water, evaporating the filtered solution, saturating with acetic acid, and again evaporating to thick extract consistence. This is now placed in a flask and 90 per cent. alcohol added. The blue coloring matter is precipitated, while the red substance and the acetic acid remain in solution. Filter, wash with alcohol, dissolve the coloring matter in hot water and again filter. The tincture should be preserved in flasks stoppered with cotton.

Sodium Peroxide as a Reagent.—Hempel (Chem., iii, 193), recommends this substance as a reagent. At the fusion temperature it oxidizes Cr, Mn and W almost immediately to the form of acids, serves as a rapid means of decomposing titaniferous iron ore, and mixed with half its weight of soda will quickly oxidize mineral sulphides.

Standard Solution of Tartar Emetic.—Solutions containing 16 Gms. of tartar emetic per litre, will keep well for 5 or 6 months if containing 20 to 30 Gms. tartaric acid, or 1 C.c. of HCl per litre. No oxidation of the Sb was noted in any case, though with some of the solutions tried, a fungous growth formed in the solutions.—Gruener (Am. Jour. Sci., 1893, 206.

. *Nitroso-β-Naphthol in Quantitative Analysis.*—Von Knorre. The reagent in an acetic acid solution precipitates Co, Fe and Cu, leaving Al, Pb, Cd, Ca, Mg, Mn, Zn and Ni in solution. Ni is only completely retained in solution in case of the presence of mineral acid. A synopsis of references to descriptions of separation affected by the reagent are given.—Zeitschr. f. Angew. Chem., 1893, 264.

Mayer's Reagent and Ferdinand F. Mayer.—Fr. Hoffman contributes to the history of this reagent and the biography of the author.—Pharm. Rund., 1894, 125.

——— Ed. Schär.—Ibid., 142.

Schweissenger's Reagent for Alkalies.—Consists of a solution of equal parts of iodine and tannin in absolute alcohol. It gives a rose tint, with very feebly alkaline solutions. It is sufficiently delicate to indicate the presence of 1 Gm. of potassium carbonate in 1,000 liters of water.—Apoth. Zeit., 1894.

Color in Quantitative Estimation.—J. W. Lovibond (Brit. and Col. Drug., 1894, 354). About two years ago Lovibond communicated some researches he had made with his well-known tintometer upon the valuation of dyes and colored solutions according to a definite scale. Some of the difficulties connected with the subject had since been overcome, and the present paper, read only in abstract, dealt chiefly with the comparison of results by different observers and the improvement of a common standard for each color. One of the greatest difficulties had been to ascertain the valuation of colors by different individuals, and reduce these to something like an average result by means of curves. But after numerous observations it was found that the average readings were really remarkably close. The varying intensity of light had also been dealt with, and here ordinary diffused daylight was best. The gradations of color, according to the strength of solutions, were well exhibited in the cases of alkaline and acid solutions of litmus, and the comparison of the readings of the tintometer shown by means of the electric light thrown on to a series of colored glasses. It was a curious fact that, of the colors of the spectrum, red with orange was more difficult to gauge than red with violet. Lovibond hazarded the opinion that eventually it would be found that there was a law of selective colors as fixed as that of gravitation. His tintometer is formed of a series of vessels with strata of varying thickness, and when solutions were poured in, the relative proportions present could be accurately gauged. Under Bedson solutions containing definite amounts of lead sulphide, permanganate of potassium, cupric sulphate, etc., had been made, and standards of colored glass equivalent to the varying strengths of solutions prepared. In a similar manner caramel in solution could be estimated and the value of logwood and other dyes determined. Dealing next with the color of water, Lovibond remarked that of course the source must be taken into account. Thus, peaty water and sewage will give similar tints, but definite standards for the same kind of water were very useful for frequent comparison. The difficulty of removing from waters solid matter which might be in suspension had only just been attacked, but some results were given of the variation after filtration, precipitation by boiling or by lime, etc.

ACIDA.

Titration of Acids by Metallic Sodium.—See Alkalimetry and Acidimetry.

Boric Acid.—A modification of Gooch's method is recommended. Free the Bo_2O_3 by heating with HNO_3 in a sealed tube, transfer to a flask, distil off with methylic alcohol, condensing in Bohemian glass. Absorb the vapors in ammonia. After distillation, with the distillate in the Bohemian glass vessel with the ammonia solution, pour upon a lot of previously-weighed CaO, let stand 15 minutes, evaporate at 70° C., heat up gradually, calcine and weigh. For 0.5 Gm. B_2O_3 use 8 to 10 Gm. CaO. The CaO must be very carefully prepared for the purpose.—Compt. Rend.; Chem. News, 1893, 309.

Boric Acid Titration.—Thomson (Jour. Soc. Chem., Ind., xii., 432).

On adding phenolphthalein to a solution of H_3BO_3, and titrating with fifth normal NaOH, the end-reaction was indistinct, and valueless. Addition of glycerin developed the acidity of the acid, and when the solution contained 30 per cent. of glycerin the end-reaction was sharp when enough NaOH to form $NaBO_2$ had been added. A further addition of glycerin caused no increase in acidity beyond this point. The method recommended for determining H_3BO_3 in borax, etc., is essentially this: Dissolve in water, add methyl-orange (on which H_3BO_3 has no effect), and then render just acid with standard H_2SO_4. Boil out CO_2, etc., and just neutralize (to methyl-orange) with normal or fifth normal NaOH. Then all H_3BO_3 is present in the free state. Then add glycerin (so that at the end the solution shall contain at least 30 per cent.), and phenolphthalein, titrate with normal or fractional normal NaOH.

$$\begin{aligned} 1 \text{ C.c. Normal NaOH} &= 0.0620 \text{ Gm. } H_3BO_3 \\ &= 0.0505 \text{ " } Na_2B_4O_7 \\ &= 0.0955 \text{ " } Na_2B_4O_7 . 10H_2O. \end{aligned}$$

If, as is sometimes the case, the borax, etc., contains ammonium salts, boil with Na_2CO_3 before acidifying with H_2SO_4, etc.

Methods for the Determination of Boric Acid.—A. K. Reischle (Zeit. f. Anorg. Chem., 1893, 111), has made a comparative study of various methods of determining boric acid, including the following: 1. Weighing the boric acid as basic magnesium borate and determining the magnesia therein. 2. Ascertaining the amount of decomposition of a weighed quantity of sodium carbonate by the boric acid. 3. Distillation of the boric acid as methyl borate (Gooch's method) and weighing as basic calcium borate. 4. Volumetric methods. 5. Weighing as potassium borofluoride. 6. Volatilization as ammonium borofluoride and estimation by difference.

As a result of his investigation, the author concludes that in all cases where the bases present with the boric acid can be weighed as sulphates, the last appears to be the best plan, the boric acid being volatilized as ammonium borofluoride. The same method can frequently be used for the determination of free boric acid. When this process cannot be carried out, it is advisable not to rely wholly upon the other methods, but to check whichever may be used by the fluoride treatment, determining the total bases to be deducted in any convenient way.

Is Boric Acid Injurious?—L. Tortchinsky has never observed any harmful effects from the use of boric acid.—Bull. Pharm., 1894, 220; from Food and Sanitation.

Detection of Hydrobromic Acid.—Villers and Fayolle also propose a test for hydrobromic acid in the presence of hydriodic acid which, like that for hydrochloric acid, they assert to have a precision comparable to that of spectroscopic methods, and to be superior to ordinary gravimetric ones. It consists in adding to the liquids to be examined, which should be free from nitric acid, an excess of ferric perchloride solution containing no free chlorine. The iodine separates and crystallizes rapidly if present in notable proportion, and is entirely volatilized on evaporating the mixture to dryness and further heating for an hour or two on a water-bath, whilst the hydrobromic acid remains unaffected. A little water is then added to the residue, the iron precipitated by an alkali, the filtrate supersaturated by hydrochloric acid, and chlorine water added drop by drop, whilst the liquid is shaken with carbon bisulphide, which is immediately colored yellow by the liberated bromine.—Compt. Rend., cxviii., 1265.

Hydrogen Bromide.—A. Gassman. Hydrogen bromide is readily prepared by adding bromine (385 Gm.) to a mixture of liquid paraffin (500 Gm.), and dry phosphorus in small pieces (50 Gm.); water (about 100 Gm.) is then gradually run in, and the evolved gas purified by passage over moist phosphorus.—Chem. Central., 1893, 771; from Schweiz. Woch. f. Pharm., 1893, 107.

Crude Hydrochloric Acid—Volumetric Estimation of the Sulphuric Acid Contained in.—L. Rümp employs a tube in which is placed 10 C.c. of the acid previously neutralized with ammonia and heated. To this is added 5 C.c. of a hot saturated barium chloride solution. The mixture is shaken for 2 minutes. In about 5 minutes the volume, as well as the SO_3 contained, is read off.—(Illustration.)—Chem. Zeit., 1893, 225.

Hydrochloric Acid Containing Selenous Chloride.—This is not infrequently met with; it has an especially destructive action upon copper vessels, acting in all probability as a carrier of chlorine, thus enabling the acid to dissolve considerable quantities of metallic copper, even in the absence of any considerable amount of air or oxygen.—J. E. Gerock, Journ. d. Pharm. v. Els. Lothr., 1893, 177; Amer. Jour. Pharm., 1893, 384.

Determining Sulphocyanic, Cyanic and Hydrochloric Acids.—Zumeau says HCNS may be determined by titration with standard permanganate in acid solution, which affords H_2SO_4 and HC_2. H_2SO_4, if present, may be determined by evaporating the solution first with HCl to decompose HC_2S, and then precipitating with $BaCl_2$. When HCNS, together with either HC_2 or HCl, is to be determined, the two acids may be determined together by titration with $AgNO_3$, and then in another portion HCNS by permanganate. If all three are present, precipitate by $AgNO_3$, and weigh the combined silver salts. Dissolve in ammonia, and determine HCNS by permanganate, checking by precipitating the H_2SO_4 formed by use of $BaCl_2$. In a weighed portion of the mixed silver salts determine N by Kjeldahl method, deduct that due to HCNS, and reckon the rest to HCN. Get HCl by difference.—Bull. Soc. Chim., 1893, 346.

Hydrocyanic Acid from Sugar.—This acid, according to F. B. Burls,

R. E. Evans and C. H. Dlach, appears to be a normal product of the reducing action of carbon and certain carbon compounds upon nitric or nitrous acid.—Chem. News, lxviii., 75.

Hydrocyanic Acid.—Estimation of.—G. Gregor. When estimating gravimetrically as silver cyanide, the precautions to be observed are that the measured quantity (50 C.c.) of the liquid (bitter almond, or cherry-laurel water, or a solution of the acid itself, so far diluted that no loss from volatilization will occur during the measuring out) is mixed in a stoppered bottle, first with 5 C.c. of 1.73 per cent. ammonia, and then with a very small excess of silver nitrate solution. Nitric acid is then added to very feeble acidity. Since acid of 0.6 per cent. already dissolves traces of silver cyanide, this degree of acidity must not be exceeded. All the above operations must be performed in the cold, and with the greatest rapidity; a delay of a few minutes causes a loss in the result. Water is added to 200–300 C.c., the precipitate caused to aggregate by shaking, washed, dried, and ignited.

Of volumetric methods, Liebig's, Vielhaber's, and C. Mohr's have, in the author's as in other hands, given higher numbers than the gravimetric. Volhard's method, carried out as follows, gives results closely agreeing with those obtained by weighing. 100 C.c. of the solution is mixed in a ¼ litre flask with 5 C.c. of ammonia, 50 C.c. of N 10 silver nitrate is added, and then immediately nitric acid, free from nitrous acid, to slight acidity. After making up and shaking, 50 C.c. of the filtrate, mixed with a few drops of ferric sulphate, and, if necessary, with more nitric acid, is titrated with N 10 thiocyanate.—Zeitschr. f. Anal. Chem., 1894, 30.

Antidote to Hydrocyanic Acid.—Since hydrocyanic acid is oxidized to oxamide by hydrogen peroxide, experiments were made by P. Krohl to see if the latter substance could be employed as an antidote in the case of hydrocyanic acid poisoning. These experiments are reported as successful, the acid, in larger quantity than the fatal dose, having been administered to dogs and cats, and its effects stayed by means of hydrogen peroxide. The experiment could be made daily for weeks together without permanently injuring the animal.—Drug. Circ., 1893, 200.

The Detection of Iodic Acid in Nitric Acid.—This may be speedily accomplished by the following tests: (1) 10 C.c. of 30 per cent. nitric acid and a few pieces of tin are slightly warmed, allowed to stand for one minute and agitated with chloroform. (2) 5 C.c. nitric acid and 0.1 Gm. sodium or calcium hypophosphite are allowed to stand for several minutes before agitating with chloroform. Iodic acid is indicated in both tests by the violet coloration of the chloroform due to liberated iodine.—Pieszczek and Looff, Apoth. Ztg., 1893, 322 and 335.

Estimation of Nitric Acid with the Nitrometer.—E. Henry.—In the ordinary forms of nitrometer, suitable for the analysis of solids, the funnel is usually ground into the main tube, and is liable, therefore, on the one hand, to be blown out by the evolved gas, or, on the other hand, to be crushed by the fingers of the operator. This defect is remedied in this instrument described. The funnel forms an extension of the reaction tube, and the solid is dissolved in it, instead of in the latter. The upper end, for this purpose, is stoppered, and the tap at the lower end provided with a channel of unusually large diameter. When the substance is completely dissolved, the solution is washed into the mercury tube with sulphuric acid in the usual way. The reaction is best carried out at a low pressure to diminish the error due to solution of nitric oxide in the acid.—Bull. Soc. Chim., 1894, 24.

Nitric Acid by Ferrous Salts—Reduction of.—C. F. Roberts has made numerous experiments to ascertain why the estimation of nitrates by means of ferrous salts generally gives results which are too low. The apparatus is described and the author draws the following conclusions: 1. The best results are obtained when the gas is passed through solution of potassium iodide. 2. If small amounts of air have got into the apparatus, they will not affect the total volume of gas if potassium iodide be not used; but if this is used, the error will be still greatly reduced by the solubility of nitric oxide in aqueous soda. 3. On account of this slight solubility, the gas should not be left too long in contact with the alkali. 4. If the hydrochloric acid used is very dilute, the reaction proceeds very slowly, but the result is not affected. 5. If the nitrate and the ferrous chloride are mixed whilst hot, higher oxides of nitrogen are formed, but they are again reduced by the potassium iodide. 6. If potassium iodide is used, there is no need for a large excess of iron.—Amer. Jour. Sci., 1893, 126.

Existence of Nitrous Acid in Aqueous Solution.—L. Marchlewski argues that if an aqueous solution of N_2O_3 is a conductor of electricity, it can only be so by virtue of the presence of nitrous acid, there being H and NO_2 ions in the solution. The author is satisfied that nitrous acid can exist in aqueous solution, and that there is thus no ground for doubting its existence in dilute nitric acid.—Zeitschr. f. Anorg. Chem., 1893, 88.

Nitrous Acid—Detection of Small Quantities of.—P. Griess proposes to acidify the liquid in question with sulphuric acid, to add a little solution of sulphanilic acid, and then a few drops of a solution of naphthylamine decolorized with animal charcoal, when the presence of nitrous acid is shown by a red color. This reaction, according to G. Lunge, is open to the objection that the solution of a naphthylamine, even if a perfectly white salt is used, darkens after a short time, and the reaction loses sensitiveness. In very dilute solutions, *e. g.*, 1 : 1000 millions, the reaction takes place so slowly that it may be doubtful whether the nitrous acid may not have been derived from the air. The time may be abridged by the application of heat, but even then it may require from fifteen to twenty minutes.

Ilosway states that the use of acetic acid, instead of sulphuric or hydrochloric acid, expedites the reaction, and renders the color much more sensitive. He alleges that the darkening of the naphthylamine may be prevented by boiling solid naphthylamine in water, and using only the aqueous solution decanted, whilst still hot, from the residue. For preparing the solution, Ilosway dissolves 0.5 Gm. sulphanilic acid in 150 C.c. dilute acetic acid. He boils 0.1 Gm. solid naphthylamine with 20 C.c. water, decants off the colorless solution from the violet-blue residue, and adds 150 C.c. dilute acetic acid.

The liquid to be tested for nitrous acid (about 20 C.c.) is mixed with a few C.c. of the solution of sulphanilic acid, and the solution of naphthylamine is then added. If nitrous acid is present to the extent of 1 : 1000 millions, the red color appears in a minute. If the quantity of nitrous acid is greater, about 1 : 1000, we obtain a yellow solution, unless a more concentrated solution of naphthylamine is used.

Lunge confirms the statements of Ilosway, and has still further improved the procedure. The reaction of nitrous acid is quite as intense if Ilosway's solutions of sulphanilic acid and naphthylamine are at once mixed together and kept in stock in a well-stoppered bottle. Exclusion of air is essential. The action of light is unimportant. If both reagents are mixed together the liquid is reddened in the bottle by the nitrous acid in the air ; it may then be again rendered fit for use by shaking up with zinc powder and filtering.—Zeitschr. f. Anal. Chem. 1894 ; Chem. News, 1894, 304.

Free Phosphoric Acid—Direct Titration of.—Geisler (Pharm. Centralh., 1894, 145) says, that hitherto the determination of free phosphoric acid has been made indirectly by the aid of barium chloride and soda-lye. The process for the determination of the presence of sodium phosphates (Pharm. Centralh., 1893, 729) makes possible the utilization of the same reaction for the quantitative determination of the free phosphoric acid. Phenolphthalein is used as an indicator. The direct determination rests on the following reaction :

$$H_3PO_4 + NaOH = Na_2HPO_4 + H_2O.$$

The real weight of tribasic phosphoric acid = 98 ; 1 C.c. of N. soda answers 1.50 C.c. equivalent phosphoric acid. See also Hagnet's paper in Jour. Pharm. Chim., 1894, 492.

Determining Phosphoric Acid.—Pemberton (Jour. Am. Chem. Soc., xv., 382) claims priority in the method by acidimetric titration of the yellow precipitate (Jour. Frank. Inst., cxiii., 193 ; Chem. News, xlvi., 7). Some references to the literature of this method are given : Thilo (Chem. Ztg., xi., 193) ; Hundeshagen (Zts. f. Anal. Chem., xxviii., 171) ; Manby (Jour.

Anal. and App. Chem., vi., 82); Handy (Ibid., vi., 204); Rothberg and Auchinvole (Ibid., vi., 243). The solutions used are: $(NH_4)_2$ MoO_4, 90 Gm. of crystals in one litre, no nitric acid; NH_4NO_3 saturated solution; standard KOH, 100 C.c. = 32.65 C.c. normal acid; 1 C.c. = 0.001 Gm. P_2O_5; standard acid, of corresponding strength. (These may be made by diluting 326.5 C.c. of normal acid or alkali, each, to one litre); indicator 1 Gm. phenolphthalein dissolved in 100 C.c. of 60 per cent. alcohol (use 0.5 C.c. for each test). The standard alkali must contain no carbonate.

Method: Dissolve 1 Gm. of phosphate rock, or 2 to 3 Gm. of fertilizer HNO_3, and without evaporating or filtering, dilute to 250 C.c. Draw off 25 C.c., neutralize it with ammonia, and then add 5 C.c. HNO_3 (Gr. 1.4). Then add 10 C.c. of the NH_4NO_3 solution, and dilute to 50 or 75 C.c., bring to a full boil, and after removing from the heat, add 5 C.c. of $(NH_4)_2$ MoO_4 solution. Follow by a second or third 5 C.c. of the reagent, as may be found necessary. Let settle, and wash with water by decantation and on the filter. (Cold water is not specified, but would probably be advisable.) Transfer the precipitate and paper bodily to the beaker, run in measured excess of standard alkali, add 0.5 C.c. phenolphthalein solution, and titrate back with the standard acid.

Determination of Phosphoric Acid.—Villiers and Borg (Compt. Rend., cxvi., 989). The reagent consists of 150 Gm. $(NH_4)_2MoO_4$ dissolved in one litre of water, adding subsequently one litre of HNO_3 (sp. gr. 1.2). 100 C.c. should be used for every 0.1 Gm. P_2O_5 present. Run the reagent in without mixing, and do not stir until two hours have elapsed. Precipitation will be complete on standing at 15° C. for four hours, unless retarded by the presence of salts; in that case four hours at 40° C. gives complete precipitation. Longer gives MoO_3 as a contaminant to the precipitate. Wash with water containing 5 per cent. of the molybdate solution by volume. One Gm. of the precipitate (dried at not over 100°) contains 0.03728 P_2O_5. In presence of Fe or Al the precipitate always contains their oxides. In that case, dissolve in ammonia, add tartaric acid, and precipitate with magnesium mixture.

Volumetric Determination of Phosphoric Acid.—Holleman says 50 C.c. of the solution, containing not over 0.2 Gm. P_2O_5 receives the addition of 10 C.c. normal $NaC_2H_3O_2$ solution, then a slight excess of tenth normal $AgNO_3$, and it is then nearly neutralized with tenth normal soda. After diluting and filtering off Ag_3PO_4, the excess of Ag remaining in solution is determined by Volhard's method.—Rec. Trav. Chem., 1893, 1.

Volumetric Determination of Pyrophosphoric Acid.—Favrel (Bull. Soc. Chem. [3] ix., 446). $Na_2H_2P_2O_7$ is neutral to cochineal, whereas with Porrier blue C4B neutrality is only shown by $Na_4P_2O_7$. On these facts a method for determination is based.

Ammonium-Magnesium Phosphate.—Neubauer (Zeitschr. f. Anorg. Chem., iv., 251), asserts that errors may result, when no excess of Mg salt is present; in that case the precipitate contains too little Mg, and some P_2O_5 is lost on igniting. When decided excess of ammonia is present; in this case more MgO than suffices to form $MgNH_4PO_4$ comes down with the precipitate, giving too high results. Obtaining exactly correct conditions in all cases is manifestly impossible. The method recommended is the use of solutions containing 2½ per cent. of ammonia. The magnesium mixture (55 Gm. $MgCl_2$, 70 Gm. NH_4Cl in 1 litre of 2½ per cent. ammonia) is added slowly (at the rate of about 10 C.c. in a minute), the dilute phosphate solution being continually stirred during the addition, with a final vigorous stir after a small excess has been added. After standing cold at least three hours, it is filtered and washed (with 2½ per cent. ammonia), and after transferring to a weighed crucible dried, and gradually heated to ignition, never allowing the temperature to pass a moderate red heat so long as any carbon remains. A correction for loss must always be applied, for which a table is given.

Pure Phosphoric Acid.—H. N. Warren suggests a method for preparing phosphoric acid in a pure state, which consists in introducing sodium or other soluble phosphate into a solution of copper sulphate; washing the insoluble copper phosphate formed, and dissolving in solution of phosphoric acid; then electrolyzing the mixture. A pure and very dense copper is said to be thrown down, and a large quantity of "pharmaceutical" acid of sp. gr. 1.75 obtained in a short space of time.—Chem. News, lxviii., 66.

Sulphuric Acid—Determination of the Strength of.—H. D. Richmond has made up a series of samples of sulphuric acid of different concentration, and has determined the densities and calculated the percentage of acid by each table, and finds that the deviation given in his table for the various strengths of acid is within the known possible errors of making up the solutions and taking the density. The differences, using Lunge and Isler's table, amount to five or six times the possible error.—Chem. News, 1894, 236.

Sulphuric Acid with Water in the Presence of Acetic Acid—Combination of.—H. C. Jones (Amer. Chem. Jour., 1894, 1–19). Evidence was obtained of the existence of the two hydrates, H_2SO_4,H_2O and $H_2SO_4,2H_2O$, in acetic acid solution, but the results do not indicate the existence of any hydrates containing a larger quantity of water, even when as much as 37 equivalents of water are present to one of sulphuric acid. These hydrates are somewhat unstable in the acetic acid when their solutions are very dilute, and when the excess of water present is not very great. They can be regarded as dissociated under these conditions by the acetic acid into sulphuric acid and water.

Chromopyro-Sulphuric Acid.—A. Recoura has prepared this compound by evaporating on a water-bath a solution containing chromium sulphate and sulphuric acid, in the molecular proportions of one to five. A dark green syrupy liquid was obtained, which after being maintained for a day or two at a temperature of 110°–115° C. solidified in the form of transparent, brittle, vitreous lamellæ. It is very soluble in water, and precipitates all metallic salts from solution.—Compt. rend., cxvii., 37 ; Pharm. Jour. Trans., 1893, 84.

New Test for Arsenic in Sulphuric Acid.—As a test for oxygenated water, Denigés had proposed a sulpho-molybdic solution containing equal volumes of a solution of molybdate of ammonium (1 to 10) and sulphuric acid. This sulpho-molybdic solution, after a certain length of time, occasionally turns blue without the operation of any external cause. Denigés has ascertained that this change of color takes place only when the sulphuric acid is contaminated with arsenic. By adding a small quantity of arsenous acid to a sulpho-molybdic solution prepared with non-arsenical sulphuric acid, the liquid is slowly colored blue. The sulpho-molybdic test should therefore be compounded with sulphuric acid which is chemically pure, or at least free from arsenic. It may then be additionally employed to detect the presence of arsenic in sulphuric acid, by heating a few cubic centimeters of the latter with a little of the sulpho-molybdic solution, and allowing the mixture to cool. If the acid contains arsenic, the blue coloration will show very clearly, but its appearance is delayed for several hours when the amount of arsenic is exceedingly small.—Drug. Circ., 1894, 12.

ALUMINUM.

Aluminum—Technical Importance of Aluminum and its Future Application.—By Herr J. Klandy. Taken from Journal of the Society of Chemical Industries, March 31, 1893. Gives the effect of small and large quantities of aluminum on copper and steel, and a general discussion of the industry.—London Iron, April 28, 1893.

Specific Gravity of Aluminum.—The ratio to that of other metals has been computed to be as follows: Aluminum being 1, zinc will be 2.7 ; tin, 2.76 ; 10 per cent. aluminum bronze, 2.89 ; 5 per cent. aluminum bronze, 3.08 ; wrought iron, 2.91 ; brass, 3.07 ; German silver, 3.24 ; nickel, 3.37 ; copper, 3.37 ; gun bronze, 3.4 ; silver, 3.98 ; lead, 4.3 ; gold, 7.31 ; platinum, 8.15.—Milit.-polit. Blätter, 1893, No. 29.

Aluminum Apparatus.—See Apparatus.

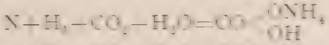
To Clean and Polish Aluminum.—Sheets of this metal are rendered beautifully white by dipping them first into a strong solution of caustic potash and afterwards into benzine ; the latter removes all dirt and grease. When thus cleansed, they are plunged into a bath of 2 parts of nitric acid to 1 of water, next into strong nitric acid alone, and finally into a mixture of equal parts of vinegar and water. They are then carefully washed in pure water, and thoroughly dried in hot sawdust. A very brilliant lustre may be imparted to objects of aluminum, without much rubbing, by immersing them in an emulsion produced by shaking together equal parts of olive oil and rum.—Drug. Circ., 1894, 12.

AMMONIUM.

Ammonium Chloride.—K. Kraut (Zeit. f. Anorg. Chem., 1892, 278), finds that when this salt is heated in a platinum dish on a water-bath, an appreciable amount is lost by volatilization; 50 per cent. of the whole, if the heating is continued for 270 hours.

Ammonia in Gas Liquors.—E. Henry (Bull. Soc. Chim. de Paris, ix. and x., No. 24). To prevent the indicator from being decolorized, the author adds to the alkaline solution a solution of lead sub-acetate.

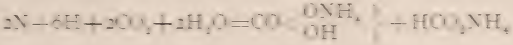
Synthesis of Ammonia.—The process is based upon the reciprocal action of nitrogen, hydrogen, and aqueous vapor in the presence of substances that act by contact. It is characterized by the addition to the gaseous mixture of carbonic acid, which fixes the ammonia formed in the state of bicarbonate or formate. The reactions to be effected are the following:



$$N+H_3-CO_2-H_2O=CO<\begin{matrix}ONH_4\\OH\end{matrix}$$

$$N+H_3-CO_2-H_2O=HCO_2NH_4$$

Or else:



$$2N-6H+2CO_2+2H_2O=CO<\begin{matrix}ONH_4\\OH\end{matrix}\Big\}+HCO_2NH_4$$

In fact, such reactions occur when the constituents, nitrogen, aqueous vapor, and water gas, of a mixture of hydrogen, CO and CO_2, are brought into contact with certain porous substances, such as pumice stone, charcoal, and boneblack, especially when they are platinized. They are produced even at a low temperature in the presence of spongy platinum or platinum black. They are more active, however, at temperatures near the points of dissociation of the salts, that is to say, toward 40–60° C. for the bicarbonate and 80–160° C. for the formate.

The gaseous mixtures pass into pipes filled with porous bodies heated to the temperatures indicated. Upon their entrance into the pipes they are saturated with aqueous vapor, either by the injection of a current of steam or by their passage into water heated to the proper temperature. Upon making their exit from the apparatus the gases pass into the water, wherein the ammoniacal salts formed dissolve. The gases that have not acted are collected and are sent back into the apparatus for a second time.

The solution of the salts is distilled over lime. If formate of ammonia is found therein, there is obtained, as an accessory product, formate of ammonia, which might serve for the preparation of formic acid or of salts. —Le Genie Civil; Scient. Amer.; Registered Pharm., 1894, 122.

Ammonia and Sodium Peroxide.—When sodium peroxide is treated with dry ammonia gas it at first turns yellow, and a small quantity of oxygen is given off. It then fuses, becomes brown, and froths up, giving off at the same time large volumes of practically pure nitrogen. Caustic soda, sodium nitrite, and nitrate are found in the residue, and the main reaction is according to the equation

$$2NH_3+3Na_2O_2=6NaHO+N_2.$$

Michel and Grandmougin have made a study of this, and also the action of ammonia on other peroxides. With the barium compound no nitrite or nitrate is produced; manganese peroxide is reduced to Mn_2O_3 with liberation of nitrogen and water, and with lead peroxide ammonium nitrate and nitrite and nitrous fumes are produced.—Chem. and Drug., 1894, 743.

Tetra-ethyl Ammonium is described by Fred. Peterson (N. Y. Med. Jour., No. 772, 320) as one of the best solvents of uric acid. He says it may be obtained by decomposing its iodide by moist argentic nitrate or its sulphate by baryta. Tetra-ethyl ammonium occurs in deliquescent hair-like needles, and absorbs carbon dioxide from the air. It is strongly alkaline and saponifies fats. It is as bitter as quinine. It has a caustic action upon the epidermis, and an unctuous, alkaline feel when rubbed between the fingers. Its formula is NEt_4OH. It is not decomposed by the galvanic current. It forms numerous salts (sulphate, nitrate, phosphate, carbonate, hydrochlorate, hydrobromate, iodide, bromide), as well as beautiful double salts with gold, platinum and mercury.

ANTIMONY.

Porphyrization of Kermes Mineral and the Chlorides of Mercury.—In preparing juleps, says Le Scalpel, pharmacists divide up kermes mineral by porphyrization with sugar or gum, and the amount of care bestowed on this operation may be estimated by the tint of the product, which is violaceous if the mixture has been rapidly made, but more or less russet in color if much time has been taken in the preparation. Many apothecaries are even in the habit of continuing the porphyrization of the materials until the brown russet tinge is developed.

Recently, however, Verne has called attention to the fact that kermes undergoes a decomposition, during this trituration, into yellow sulphide of antimony. Kermes porphyrized for a half hour with sugar or gum, and then treated with ammonia, gives a yellow filtrate, which is proof of the existence of not less than 10 per cent. of golden sulphide.

Calomel treated in the same manner undergoes no alteration: but sublimate, even when porphyrized alone, is partially decomposed, with the formation of a very appreciable amount of calomel.—Nat. Drug., 1894, 41.

Black Antimony Trisulphide.—C. A. Mitchell. By dissolving 5 Gm. of antimony trioxide in 30 C.c. of a mixture of two parts of hydrochloric acid and one of water, and saturating the solution with hydrogen sulphide, then keeping it boiling while a current of carbonic anhydride is passing through, a portion of the orange sulphide dissolves, but some is precipitated as black sulphide; by repetitions of the treatment, all the sulphide ultimately assumes the latter form, which has the composition Sb_2S_3.—Chem. News., 1893, 291.

Antimony-blue.—S. Sebor. Antimony-blue is prepared by dissolving antimony sulphide in concentrated hydrochloric acid. and, after filtering, adding to the boiling liquid a concentrated solution of potassium ferrocyanide and some potassium chlorate or nitric acid; the precipitate is dried at 100° C. Unlike Prussian-blue, it is not soluble in a solution of an oxalate or tartrate.—Chem. Centralb., 1893, 318.

ARSENIC.

Arsenic and its Compounds.—Retgers (Zeitschr. f. Anorg. Chem., iv., 403) finds that there are only two well-defined allotropic modifications of arsenic, and that they closely correspond to the two forms of phosphorus. A silvery-white hexagonal form accords with the red phosphorus, and a black variety, crystallizing in regular octahedrons, corresponds with ordinary yellow phosphorus. It is suggested that there may be a third modification with crystals belonging to the monoclinic system. The brown spots formed upon the cold porcelain, in Marsh's test, are shown to consist of arsenic hydride, AsH, produced by the partial dissociation of the gaseous AsH_3. This is soluble in boiling xylene and may thus be distinguished from elementary arsenic, which is totally insoluble in xylene. Dr. Retgers also adduces evidence which seems to prove that a lower oxide of arsenic, probably As_2O, is capable of existence.

Trisulphide of Arsenic.—According to D. Vitali (Boll. Chim.-farm., through Rép. de Pharm., 1893, 363) it is absorbed by the organism in small doses, and is transformed into arsenous acid, which is eliminated by the urine. Sulphide of arsenic, deprived of arsenic acid, has no direct influence on the organism, but favors the action of small doses of this acid.

Arsenates.—Test for.—J. Lothian dissolves the substance in dilute HCl, or if soluble the solution is acidulated with HCl,$Na_2S_2O_3$ then added, the solution warmed, and H_2S gas passed in. Arsenous sulphide is ppt. at once.—Pharm. Jour. Trans.. 1893, 350.

Arsenic.—Favrel records that cochineal is indifferent to H_3AsO_3, and the base combined therewith may be accurately estimated by an alkaline solution using cochineal as an indicator.—Bull. Soc. Chim., ix., 448; Jour. Pharm. Chim., 1893, 301.

Tests for Arsenic.—Clark (Jour. Chem. Soc., 1894, 119) finds that "none of the methods which have been proposed for the generation of

AsH_3 in an alkaline solution, detect arsenic acid." Reinsch's test as ordinarily conducted, gives uncertain results when the amount of As is small, and is not suited for quantitative estimations.

The author proposes to dissolve the As and Sb from the copper foil by cold digestion with dilute KOH and H_2O_2 solution, evaporation to small bulk, and distillation by Fischer's method ($FeCl_2$ and HCl). In the discussion, Dr. Dyer remarked on the fact that some forms of cast zinc hold back appreciable quantities of As in the Marsh apparatus; a phenomenon not noticed with granulated zinc. The presence of platinum black in the generating flask also tends to hold back some As.

Simplification of the Fresenius-Babo Arsenic Test.—A. Blemquist finds that the replacement of the sodium bicarbonate by an ammoniacal solution of arsenic sulphide not only answers all requirements but saves much time. In evaporation to dryness the small amount of carbonic acid that is thus evolved, acts in such a manner that the residue of evaporation is easily scraped off, while, as is well known, when the sodium carbonate is used it clings and sticks very tenaciously.—Nat. Drug., 1894, 188.

Pharmacopœial Test for Arsenic Criticised.—John C. Umney communicates the following: A modification of Bettendorf's test for the detection of arsenic has been generally adopted in the new edition of the U. S. Pharmacopœia. The original test is a most useful one, and, as usually applied, consists of the addition of a solution of stannous chloride in hydrochloric acid, but is now modified in the above work by the presence of metallic tin, which in the case of the salts of bismuth and antimony appears to be inadmissible. Under the head of bismuth subcarbonate we read as follows: "If 1 Gm. of the salt be ignited in a porcelain crucible, the residue when cold dissolved in 5 C.c. of stannous chloride T. S. (see list of reagents, Bettendorf's test for arsenic), and a small piece of pure tin foil added, no dark coloration or precipitate should be produced within fifteen minutes (limit of arsenic)." If this test be carried out with samples of the salts of bismuth and antimony—the salts and reagents having been previously proved to be free from arsenic—the following reaction takes place: (1) Bismuth salts: The solution darkens immediately on the addition of metallic tin, and a heavy black precipitate rapidly forms. At the end of the prescribed time, if the mixture be well agitated, almost complete precipitation of the bismuth has taken place, so that if the liquid separated by filtration be poured into water, hardly any precipitation of oxy-salt occurs. The black precipitate is found to consist wholly of bismuth. (2) Antimony salts: Under the same conditions, the precipitation is not so rapid as in the case of bismuth salts, nor so complete, but a black precipitate is formed, quite masking any indication of arsenic if present. If Bettendorf's reagent be applied, without metallic tin, to a solution of the chlorides of either metal in hydrochloric acid, the minutest quantity of arsenic may be detected. This is essentially the test of the German Pharmacopœia given under subnitrate of bismuth.—Amer. Drug. and Pharm. Rec., 1893, 352.

Arsenic Mining.—Articles on "Arsenic Works on the Lamar," by S. B. Gould.—Graphic, July, 1893: Chem. and Drug., 1893, 196.

Arsenic and Antimony Chlorosulphides.—L. Ouvrard has prepared As_2ClS_5; SbS_2Cl in reddish brown crystals and Sb_2S_3Cl.—Compt. rend., 1893, No. 26.

Dimethyl Arsine.—A. W. Palmer (Ber. d. Chem. Ges., 1893, 1378) has prepared this compound, the chloro-derivative of which is well-known as cacodyl chloride, by the reduction of tetramethyl diarsine $(CH_3)_4As_2$ in alcoholic solution with platinized zinc and hydrochloric acid gas.

$$(CH_3)_4As_2 - H_2 = 2(CH_3)_2AsH.$$

It is a colorless mobile liquid, boiling at 36°–37° C.

Arsenic in Wall Papers—Quantitative Determination of by the Berzelius-Marsh Process.—C. R. Sanger.—Proc. Amer. Acad. Arts and Sci., vol. xxvi. and xxix.

Formation of Volatile Compounds of Arsenic from Arsenical Wall-papers.—C. R. Sanger.—Ibid.

Chronic Arsenical Poisoning from Wall-papers and Fabrics.—C. R. Sanger.—Ibid.

A large portion of these papers is simply historical, the author going back as far as the year 1815 in reviewing a number of cases of arsenical poisoning.

In the first paper he describes the work done by Marsh, Berzelius, and others on the quantitative estimation of small quantities of arsenic by direct weighing, and points out that the first practical application of their methods was made by Gautier in 1876.

He then gives in detail the methods of comparison of mirrors as he has used it in the analysis of wall-papers, making reference to the analytical and experimental work which follows. This also is all given in full, and finally the results obtained by the Berzelius-Marsh and other processes are compared.

Before the process herein described was worked out, it was thought that merely an approximation of the amount of arsenic would be given, but it has been found that with care it can be made to give results worthy of comparison with other quantitative methods. The process is expected to be of great value in toxicology, not only as a rapid means of determining the quantity of arsenic present, and as a check on other methods; but also as the only means of accurately determining the amount when arsenic is present in minute quantity. The extreme sensitiveness of the method can be seen from the fact that as little as 0.0007 Mgm. of arsenic has been detected with certainty.

The two following papers deal with mechanical means by which the poison is actually introduced into the system, and the methods of getting rid of it again. Experiments are described which were intended to repeat the work of Fleck and Amberg, and which were based on the assumption that the volatile compound, if formed, would be arsenuretted hydrogen, but on account of their negative results they are not given in much detail, for the conclusions arrived at were shown by a second series of experiments to be erroneous. This second series of experiments, carried out as closely as possible after the method described by Gosio, whose work on this subject has received but little attention, proved beyond a doubt that there was a volatile compound formed by the decomposition of arsenical matter by the action of mould. Artificial moulds were cultivated, four of which had a very strong action ; but it is worthy of note that the most intense action is possessed by the mould discovered on decaying paper, and it must not be forgotten that a small amount of arsenic in a wall-paper may be quite as good a source of the volatile compound as a very large amount. The author has not made any investigation into the nature of the compound, as he considers that such work would be trespassing on Gosio's field ; but he thinks the chances are that no arsenuretted hydrogen is formed at all, but that we have to deal solely with an organic compound of arsenic.

The method of diagnosing in cases of suspected arsenical poisoning is fully given, and great stress is laid on the necessity of examining the urine for arsenic, this being one of the most certain indications of the presence of the poison in the body.

BARIUM.

Atomic Weight of Barium—Revision of the.—T. W. Richards, in Proc. Am. Acad. Arts and Sci., vol. 28 ; Chem. News, 1893, 269.

Soluble Colloidal Barium Sulphate.—By mixing 120 parts of a 40 per cent. barium acetate solution with 80 parts of a 60 per cent. aluminum sulphate solution slightly acidified with acetic acid, a thick, transparent, pasty mass was obtained, which only after standing for some time precipitated or changed into the usual white barium sulphate. The original mixture placed upon a filter gave a perfectly transparent filtrate which, by diluting with water, gave a white turbidity and separated barium sulphate ; the residue in the filter after some time became white. Both of the reagents had been prepared with heat but had cooled to 15° C. before they were mixed. An explanation of this result on the ground of the solubility of barium sulphate in solutions of aluminum or barium acetates is not tenable, since 200 C.c. of the solution would have to dissolve about 36 Gm. barium sulphate.—George Buchner, Chem. Ztg., 1893, 878.

Barium Sulphate Precipitate.—Phinney says contamination by alkali chlorides can only be removed by fusing with Na_2CO_3, and re-precipitating (Fresenius) or dissolving in strong H_2SO_4 and evaporating (Mar). The use of a Gooch filter with asbestos bed is preferable to avoid reduction to BaS on ignition.—Am. Jour. Sci., 1893, 468.

Precipitating Barium Sulphate in Presence of Silica.—Sleeper (Chem. News, lxix., 63). The results of a number of trials go to show that SiO_2 is not co-precipitated with $BaSO_4$ under the conditions ordinarily obtained in, say, examination of pyrites.

Treatment of $BaSO_4$ with HF and igniting, caused a loss, due apparently to the formation of BaF_2. If but little H_2SO_4 was added together with the HF, some loss, though not so much, was experienced; with larger quantities of H_2SO_4, decomposition of the kind could be entirely prevented, and no loss was sustained.

Barium Sulphate.—Browning (Am. Jour. Sci., xiv., 399). Experiments are quoted which go to show that the presence of 10 to 15 per cent. of strong HNO_3, by volume in a solution, does not materially diminish the amount of $BaSO_4$ precipitated. Aqua regia had still less solvent power. In presence of salts which exert, ordinarily, a solvent action, citrates, metaphosphates, etc., the addition of 10 per cent. of HNO_3 renders the precipitation complete, but the precipitate needs subsequent purification.

BISMUTH.

Purification of Bismuth from Arsenic and Antimony.—E. Matthey finds that when bismuth, containing arsenic or antimony, or both, is heated beyond the melting point, the impurities named are volatilized and escape without loss of bismuth. To get rid of arsenic the heat should not be less than 531° C., while 440° C. drives off antimony. The process is especially valuable in cases where not more than 1 per cent. of either impurity is present in the bismuth.—Jour. Pharm. Chim., 1893, 271.

New Bismuth Compounds.—See New Remedies.

Bismuth Sulphite.—Last year Pollaci mentioned the therapeutical importance of bismuth sulphite, and indicated the following two modes of preparation: (1) Cause sulphurous acid gas to react on bismuth carbonate recently precipitated and diluted with water; bismuth sulphite is formed, and carbonic acid liberated. (2) Decompose neutral bismuth nitrate by means of sodium sulphite; bismuth sulphite and sodium nitrate will be formed. The first mode of preparation has certain drawbacks; the decomposition of the bismuth carbonate is relatively slow, and washing is difficult and unsatisfactory, the salt retaining a rather strong sulphurous odor. The second procedure is, therefore, preferable; the salt is more easily washed, and the operation requires less time. Attention is called by P. Caesaris and A. Raschetti (L'Union Pharm., 1894, xxii., 230,) to the reaction going on in the gastro-intestinal tract between bismuth sulphite and sulphuretted hydrogen, bismuth sulphide being formed and sulphurous acid set free. This reaction is extremely important, from a therapeutic standpoint, for sulphurous acid is a very energetic antiseptic. Bismuth sulphite thus behaves in the intestine like bismuth subnitrate, with this difference, that it yields sulphurous acid, while the subnitrate gives rise to the production of nitric acid. It has thus far been experimented with only on animals, but clinical reports are soon expected.

Danger in Prolonged Administration of Bismuth Subnitrate, and other Insoluble Substances, in Large Doses.—G. Hoppe-Seyler (Sem. Méd., 1893, No. 26) has become convinced that the prolonged use of insoluble antidiarrhœic medicaments, even in ordinary doses, is not exempt from certain (and sometimes quite serious) inconveniences. One case he observed died of peritonitis. The patient had been treated for a month for persistent diarrhœa, with bismuth subnitrate (in daily doses of 2 Gm.) and with zinc-oxide enemata. The autopsy revealed the presence in the rectum of an intestinal concretion as large as a duck's egg. It was constituted of a nucleus of zinc-oxide and a peripheral layer composed of bismuth sulphide, zinc-oxide, and organic substances. The autopsy of another patient who died of tuberculosis, and who had taken daily, for two months, 2 Gm. of bismuth subnitrate, showed in the tuberculous ulcerations a large number of concretions composed of bismuth sulphide; deposits of this were also seen in the pyramids and the straight canaliculi of the kidneys. Insoluble anti-diarrhœal medicaments—such as bismuth subnitrate, zinc-oxide, talc, etc.—should, therefore, be used prudently, since their continued application may, it seems, not only cause a formation of intestinal calculi, but also give rise even to renal lesions.—See also Amer. Therap., 1893.

A Bismuth Mine in Tasmania.—This promises to prove unusually rich in this metal, a nugget of pure native bismuth weighing fifty-four pounds having been found in a mine on the east coast. This being true, there are good prospects for a decided decline in the price of bismuth compounds. —West. Drug., 1893, 484.

Mexican Bismuth.—Several species of bismuth have been discovered in Mexico.—Chem. and Drug., Sept. 2, 1893.

The Bismuth Breakdown.—History of the bismuth syndicate and bismuth industry.—Chem. and Drug., 1894, 801.

BORON.

New Boron Compounds.—Michaelis has prepared diphenyl boron chloride, $(C_6H_5)_2BCl$, by heating in a sealed tube to 300°–320° C. the monophenyl compound, first obtained in 1879, with mercury diphenyl. When pure it is a thick, colorless liquid, fuming slightly in moist air. It decomposes upon heating with water, diphenyl boric acid resulting. The colorless or faintly yellow crystals of this acid melt at 264° C. and possess a very powerful and penetrating odor. The acid dissolves readily in alkalies, but can be readily extracted from solutions of the salts thus formed by organic solvents.

Bromoborates of Iron and Zinc.—Rousseau and Allaire have shown that it is possible to replace the magnesium in boracite by iron, zinc or other metal.—Compt. rend., cxvi., 1445, 1446.

CAESIUM.

Separation of Caesium.—Wells (Am. Sci., xlvi., 186). Cs_2PbCl_6 is practically insoluble in a $PbCl_2$ solution in HCl saturated with Cl, the corresponding Rb salt being more soluble. The formation of this compound affords a means of separating Cs completely from other alkali metals, and partially from Rb.

CALCIUM.

Calcium Carbide.—H. Mossian has prepared a crystalline compound of carbon and calcium, C_2Ca, by employing the great heat of his electric furnace, the temperature in which may approach 3500° C. The crystals obtained are described as reddish-brown, opaque, and shining. Their density, taken in benzin at a temperature of 18°, is 2.22, and they appear to be totally insoluble. Hydrogen has no action upon the new compound, but the latter becomes incandescent in dry chlorine at a temperature of 245°, calcium chloride and carbon resulting. Bromine reacts with the carbide at 350°, and iodine vapor decomposes it at 305°. In oxygen it is decomposed, with formation of calcium carbonate, and in sulphur vapor at 500°, sulphides of calcium and carbon being formed. Nitrogen has no effect; phosphorus vapor converts the carbide into phosphide, without incandescence; arsenic in vapor reacts with the disengagement of much heat, and also combines with the calcium. Iron and antimony are the only two metals found to react with the calcium carbide. The most curious reaction, however, in which the new compound takes part, is that which occurs when water is added to it. Pure acetylene is given oft directly contact takes place, and the gas continues to be evolved until all the carbide is decomposed, thus:

$$C_2Ca + H_2O = C_2H_2 + CaO.$$

When aqueous vapor acts upon the carbide at a dull red heat, the decomposition takes place less energetically, and hydrogen is produced in addition to acetylene. Acids act upon the carbide chiefly when diluted, though fuming sulphuric acid decomposes it and develops a marked aldehydic odor, and chromic acid reacts with formation of carbon dioxide. Various metallic salts also cause decomposition, and when the compound itself is heated in a sealed tube with absolute alcohol to 180° C., acetylene and calcium ethylate are formed as follows:

$$2(C_2H_5OH) + C_2Ca = C_2H_2 + (C_2H_5O)Ca.$$

A fine class experiment, demonstrating the violence of the reaction between acetylene and chlorine, is readily performed by allowing some fragments of calcium carbide to fall into a vessel containing cold water saturated with chlorine, the reaction being immediate.—Compt. rend., cxviii., 501.

The Pink Color in Calcium Chlorate Solution. This color developed when chlorine is led into milk of lime in the first step in the manufacture of potassium chlorate, has been proven by the spectroscope to be due to the presence of permanganate.—Chem. Zeit., 1893, p. 653.

Calcium Phosphate.—In the course of an article discussing the therapy and pharmacology of the calcium phosphates, P. Carles arrives at the conclusion that the normal or tribasic phosphates only should be employed. In the hydrated form it is most easily assimilable, being most soluble in the gastric humors. It is best prepared from pulverized animal charcoal, and if it is precipitated from at least two hundred times its weight of water by sodium carbonate it is easily held in suspension in syrup, its properties being thus preserved indefinitely.—Bull. de Pharm. de Bord., 1893, 207; Amer. Jour. Pharm., 1893, 500.

Calcium Di-phosphate.—A. Joly and E. Sorel, in describing the action of water on this compound, state that if crystals of the hydrated salt be thrown into boiling water they are rapidly disintegrated, and the liquid, which is acid to litmus, though neutral to methyl orange, is found to contain a mono-phosphate. On examining the deposit formed, by means of a microscope, no trace of crystallization is visible, and analysis shows it to consist of an almost pure calcium tri-phosphate. After drying at the ordinary temperature over sulphuric acid the composition of this compound was found to be $2Ca_3(PO_4)_2.H_2O$. If ebullition be maintained, and the volume of water kept constant, a second reaction takes place between the liquid and the deposit. Small crystals appear, very slowly if the proportion of the calcium di-phosphate were less than one per cent., more rapidly if between that and fifty per cent., but in any case the reaction is complete in about three hours. The final product is a partly amorphous mixture, $(CaO)_3P_2O_5$, when not more than ten Gm. per litre of calcium di-phosphate is used. Crystallization is total, however, with larger proportions, an intermediate phosphate apparently being formed, thus,

$$Ca_3(PO_4)_2 + 4Ca_2H_2(PO_4)_2 + 2H_2O;$$

while with very large proportions the crystals of the latter are found mixed with those of an anhydrous bi-calcium salt. The transformation of the crystalline hydrated calcium di-phosphate into the crystalline anhydrous salt, by the action of boiling water, appears, therefore, to be effected in two different stages, the amorphous calcium tri-phosphate being the intermediate product.—Compt. rend., cxviii., 738.

Calcium Sulphate in Sulphurous Acid.—Examination of crystals in sulphurous acid. The crystals, although bulky, weighed only about 0.7 Gm., and on examination were found to consist of calcium sulphate. On boiling with water and adding barium chloride solution, a white precipitate of barium sulphate formed. On adding ammonium oxalate, a white precipitate, insoluble in acetic acid, resulted. The absence of metals other than calcium was established. Calcium was either naturally present in the water used or was introduced accidentally. On the slow oxidation of sulphurous into sulphuric acid, calcium sulphate was formed. This, being somewhat soluble in water, did not precipitate as soon as formed, but slowly crystallized out as the solution became supersaturated in the progress of the oxidation.—Fred. A. Sieker, in Notes on New Rem., 1893, 102.

Phenated Lime.—This preparation (chaux phéniquée) is said to be much used in Russia as a disinfectant. Lime, three parts, is well slaked with five or six parts of water; then gas tar, two parts, is added, little by little, the mass being well stirred during the operation. A yellowish-brown product results, which is mixed with water and used in the liquid form (Journ. de Chir. d'Anvers, through Moniteur de la Pharm.).—Pharm. Jour. Trans., 1894, 733.

Inertness of Quicklime.—V. H. Veley (Jour. Chem. Soc., 1894, 1) comes to the conclusion that dry chlorine does not combine with dry lime, at ordinary temperature, to form the so-called bleaching powder. No appreciable chemical change is observable between these two substances below a temperature of 300° C., when a partial replacement of oxygen by chlorine takes place; under these conditions the reaction is analagous to that of baryta and chlorine, not specially dried, and at ordinary temperatures.

CARBON.

Carbon Boride.—H. Moissan also describes the compound of boron and carbon, B_6C, first obtained by Joly (Compt. rend., xcvii., 456), and since prepared in sufficient quantity by means of the electric furnace to permit of an examination of its properties. The compound, which forms brilliant black crystals of the density 2.51, is said to be very stable and extremely hard. In the latter respect it even exceeds the carbon silicide which is now offered in commerce as "carborundum," for the powder obtained by crushing it has proved to be capable of replacing diamond-dust in the process of cutting diamonds. This is believed to be the first instance of a definite compound body being sufficiently hard to cut the diamond.—Compt. rend., cxviii., 556.

New Chloride of Carbon.—E. Barral has prepared the bichloride of benzene hexachloride, $C_4Cl_6.Cl_2$, by acting upon phosphorus pentachloride with hexachlorophenol, C_6Cl_6O. It occurs as long colorless prisms, melting at 159° to 160 °C., and forming a liquid which becomes yellow at a higher temperature, being decomposed into chlorine and benzene hexachloride. The new compound is very soluble in anhydrous ether, benzene, or alcohol, especially when warm. Aqueous caustic soda solution does not affect it, but warm, fuming nitric acid dissolves it slowly, probably with decomposition of the chloride.—Compt. rend., cxviii., 1049.

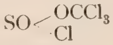
Carbon Tetrachloride.—By warming a mixture of sulphur chloride and carbon disulphide with finely divided iron or a metallic chloride, such as ferric chloride, the following reaction takes place :

$$2S_2Cl_2 + CS_2 = CCl_4 + 6S.$$

The liquid separated from the S is subjected to fractional distillation. In the place of sulphur chloride the higher chlorinated compounds of sulphur may be used.—Pharm. Jour. Trans., 1894, 732.

Estimation of Carbon Dioxide in Presence of a Soluble Sulphide.—Wolkowicz (Zeits. f. ang. Chem., 894, 165) proposes the following method of estimating carbon dioxide in the presence of a soluble sulphide. After fitting up the Fresenius apparatus in the usual manner an excess of a 20 per cent. solution of copper chloride is added to the substance to be examined, which is placed in the generating flask. The sulphide contained in the substance under examination then forms a sulphide of copper which is completely insoluble in hydrochloric acid, and the carbon dioxide is then driven off and absorbed in soda and lime tubes and weighed in the customary manner.

Action of Nitrohydrochloric Acid on Carbon Bisulphide.—Schlagdenhauffen and Bloch (Jour. Pharm. Chim., 1893, 241). A mixture of carbon bisulphide with an excess of nitrohydrochloric acid was distilled, when white crystals were found to have deposited on the neck of the apparatus, becoming very abundant upon several re-distillations. These crystals were very volatile, and upon increasing the heat, passed to the receiver, which was cooled with a freezing mixture. The remaining acid liquid yielded an abundant precipitate to barium chloride, while the product of the distillation, deprived of acid by washing with water, deposited upon spontaneous evaporation, white, volatile crystals, possessing an irritating intolerable odor; they sublimed slowly at ordinary temperature, fused at 135° C., dissolved in nearly all ordinary solvents, particularly in carbon bisulphide, but were insoluble in water, and were precipitated from their solution in absolute alcohol by an excess of water. These properties point to the identity of the crystals with the trichlormethylsulphurous chloride, obtained by Kolbe from the action of manganese dioxide and hydrochloric acid on carbon bisulphide, and possessing the formula :



$$SO\langle{}^{OCCl_3}_{Cl}$$

Carbon Disulphide.—Employed in chemical analysis by F. Musset as a means of separating small quantites of precipitates, indifferent to hydrogen sulphide, from aqueous suspension ; the precipitates becoming suspended in the carbon disulphide, if a small quantity of this be agitated with the aqueous mixture, the aqueous solution becomes perfectly clear so that it can be decanted; after the evaporation of the carbon disulphide from a capsule the precipitate is obtained in a condition for further examination. The advantage of the method is that the small precipitate is not collected upon a filter, and can be more easily examined. In the decomposition of ammonium sulphide solutions of the sulphides of arsenic, antimony, tin, etc., by hydrochloric acid, the agitation of the acid solution with carbon disulphide removes the precipitated sulphur by dissolving it, so that it is possible to say at once if the sulphur was accompanied by any of the above-mentioned sulphides, as the latter are not soluble in the solvent; in the presence of these sulphides the carbon disulphide is opaque, due to the suspended sulphides, while the aqueous solution is perfectly clear.—Pharm. Centralh., 1893, 737.

Sulphide of Carbon—A New.—A. E. Tutton (Nature, 49, 275) describes a new liquid sulphide of carbon, isolated by Von Lengyel. The liquid has a specific gravity of 1.2739, and when heated it polymerizes into a hard black substance. Analyses of the liquid and solid indicate the same empirical formula, C_3S_2, for both. The liquid can be only partially distilled in vacuo, and in a few weeks it spontaneously changes into the more stable black solid. It readily ignites, and is dissolved by caustic alkalies, as well as by 70 per cent. nitric acid. The liquid sulphide combines readily with six atoms of bromine, and the compound form, $C_3S_3Br_6$ has, curiously enough, a pleasantly aromatic odor.

Carbon Silicide—Crystallized.—H. Moissan has obtained large crystals of CSi by the aid of his electric furnace.—Compt. rend., cxvii., 425.

Carbon in the Electric Arc—Ebullition of.—M. Violle has established the fact that the constancy and brilliancy of the arc light is due to the fact that the carbon is given off in a state of ebullition, a proposition which seems reasonable when we reflect that the temperature of substances in ebullition is always constant.—Journal de Physique, 1893.

Artificial Diamonds.—H. Moissan deals with the results of his latest attempts to form diamonds artificially. Under various conditions he has been able to obtain a transparent black variety of carbon, certain specimens of which present a distinctly crystalline appearance. The density of these is between 3 and 3.5, they scratch the ruby, resist the action of potassium chlorate and fuming nitric acid, and burn in oxygen at a temperature of 900° C. to produce four times their weight of carbon dioxide, in all these respects according exactly with natural diamonds, which alone are known to possess similar properties.—Compt. rend., 1894, 320.

Certain New Properties of the Diamond.—H. Moissan (Bull. Soc. Chim. de Paris, ix. and x., No. 24.) The heat of combustion of the diamond varies in different specimens between 760° and 875° C. In general, the harder the diamond the higher its combustion heat.

Ash of the Diamond.—H. Moissan (Ibid). All specimens of African bort and diamond contained iron. It has also been found in the ash of carbonado and diamonds from Brazil, except in a green kind of bort. In all specimens silicon has been detected, and in most cases also calcium.

Wood-Charcoal—Action of Sulphuric Acid Upon.—A. Verneuil proves that one of the acids produced in the oxidation of charcoal by means of sulphuric acid is mellic acid. The author has not yet found a simple and rapid method of purifying the salts which remain in the brown aqueous solution separated from the crude mellate. The process which he has adopted consists in transforming the ammonia salts into barium salts, in dissolving the latter in hydrochloric acid, and then fractionating the baryta. The brown substances which contaminate these products are thus removed.

He obtained also pheno-pentamethyloic acid. It yet remains for the author to determine if these acids are really derived from carbon, or if they are merely the results of hydrogen products which an incomplete calcination always leaves in wood charcoal.—Compt. rend., cxviii., 195.

CERIUM.

Cerium Reaction.—Plugge (Arch. Pharm., ccxxix., 558) reverses Sonnenschein's test for strychnia, and uses strychnia sulphate as a test for cerium. The solution suspected of containing Ce receives the addition of dilute NaOH sufficient to give perceptible alkalinity. It is then evaporated to dryness, and a few drops added of conc. H_2SO_4 in which one-thousandth part of strychnine has been dissolved. 0.01 Mgm. CeO gives a perceptible blue violet color, which is weak and soon disappears. 0.1 Mgm. gave a strong reaction, first blue, then permanently red. The oxalate will not give this reaction until after heating, to destroy the oxalic radical.

CHLORINE.

Chlorine Titration.—The presence of even small amounts of alkali silicates appeared to interfere seriously with the accuracy of the titration of chlorides (standard $AgNO_3$ with K_2CrO_4 indicator).—Fairley (Analyst., 1893, 222.

Volumetric Method for Chlorides.—Young (Analyst, xviii., 125) has investigated sources of error. Dilution was found to be one source, temperature another; incidentally the solubility of Ag_2CrO_4 was determined and found to be 6 parts in 100,000 at 155° C. and 18 parts in 100,000 at 100°. For correct results the solution of chloride should be evaporated low and the temperature kept down.

Estimating Free Chlorine.—Friedheim (Zeitschr. f. Anorg. Chem., iv., 145). If the Cl is absorbed in Na_2CO_3 and to this solution KI is added, and the titration performed with standard $Na_2S_2O_3$, the results are always low. The reason assigned is that some sulphate is formed in the alkaline solution by interaction of I and $Na_2S_2O_3$. If, however, the Na_2CO_3 solution, in which the Cl has been absorbed, is mixed with a KI solution containing excess of H_2SO_4, the titration results are correct.

CHROMIUM.

Chromium Tungstate.—E. F. Smith and H. L. Dieck have prepared this compound in a crystalline form by fusing together potassium dichromate and an equivalent amount of pure tungstic oxide.—Jour. Amer. Chem. Soc., xv., 151.

Chromium Determination.—Spuller and Kalman (Chem. Ztg., xvii., 1412). Fusion with caustic soda and Na_2O_2 is not well adapted for decomposition of hardened chrome steel, but it is applicable to ferro-chrome, and to chromite. Ferro-silicon and ferro-tungsten may also be decomposed by this method.

COPPER.

True Atomic Weight of Copper—Determination of the.—G. Heinrichs criticizes the work of the school of Stas, and cites the work of T. W. Richards on the determination of the atomic weight of copper.—Nat. Drug., 1893, 183; from Chem. News, 1893.

Cupriammonium Double Salts.—T. W. Richards and H. G. Shaw have discovered a new class of compounds. The generic feature of the new class is that the different acids, a hydrogen and an organic acid radicle, are united at the same time to the ordinary cupriammonium group.—Chem. News, 1894, 21.

Copper Fluorides.—Poulenc has succeeded in obtaining cuprous fluoride by acting upon cuprous chloride with gaseous hydrofluoric acid. The anhydrous compound forms a transparent ruby-colored mass having a crystalline fracture. It is insoluble in boiling alcohol and sulphuric acid, but soluble in boiling hydrochloric acid and nitric acid. Cupric fluoride (CuF_2) is readily prepared from cuprous fluoride.—Compt. rend., cxvi., 1446; Pharm. Jour. Trans., 1893, 85.

Cuprous Oxide.—E. J. Russell refers to the difficulty frequently experienced in decanting or filtering when preparing cuprous oxide by the ordinary method, and suggests the following modified process: A mixture of copper sulphate with excess of sodium chloride is dissolved in water, so as to form a fairly concentrated solution. Sulphur dioxide gas is now passed through to saturation, the cupric chloride formed being held in solution by the excess of sodium chloride. The sulphur dioxide is then expelled by heat, solid sodium carbonate added while the solution is hot, and a beautiful bright-red precipitate of cuprous oxide settles speedily, and can readily be washed by decantation.—Chem. News, lxviii, 308.

Cuprous Phosphide (Cu_2P_2).—A. Granger has prepared this compound in a crystalline state and free from metallic copper by the action of phosphorus upon a cupric salt. It occurs as a gray crystalline powder, having somewhat the appearance of plumbago.—Compt. Rend., cxvii., 231; Pharm. Jour. Trans., 1893, 181.

Test for Copper.—A delicate test for copper, depending on the formation of cuprous bromide, is given by Sabatier as follows: Into 1 C.c. of concentrated hydrobromic acid allow to flow two drops of the liquid to be tested; if copper is present a purple to light violet coloration will instantly appear.—West. Drug., 1894, 181.

Detecting Iron in Commercial Copper Sulphate.—On 5 C.c. of a 20 per cent. solution of the suspected copper sulphate contained in a test tube carefully pour 5 C.c. of a 10 per cent. ethereal solution of salicylic acid. If iron is absent no coloration will be perceptible at the point of contact of the two liquids, while if iron is present the well-known violet color will be observed, the intensity of which will vary with the extent of the contamination.—Pharm. Centralh., 1894, 28; from Boll. Chim. Farmac., 1893, 32, 549.

Copper Titration.—Borntrager (Zeitschr. f. Angew. Chem., 1893, 517) describes his mode of applying Pelouze's method. (Titration in ammonia solution with Na_2S.) To avoid any separation of oxysulphide, the titration should be performed in the cold, with vigorous agitation. For the end-reaction the use of alkaline Pb solution is better than the nitroprusside test; but the author prefers to either, the filtration of a few drops of the solution into solution of ferrocyanide, strongly acidified with acetic acid. When all Cu is precipitated, the reddish Cu_2FeCy_6 does not appear. For standardizing, use Cu solution, containing the equivalent of 10 Gm. of metal per litre. The Na_2S solution should equal this, C.c. for C.c. It should be made by dissolving 40 Gm. of commercial Na_2S in one litre. The solution should be kept in small well-filled bottles, and standardized whenever it is used. The strength was found to be reduced about one half by keeping for 18 months. In presence of Zn, CuS will form first, so that the titration can be conducted in a solution of brass, etc. The application in the cases of some other commercial products is described.

Certain Novel Articles of Copper Derived from Ancient Egypt.—M. Berthelot considers that an age of pure copper very probably existed before that of bronze. He regrets that historians and archeologists apply the term bronze indiscriminately to alloys and to pure copper. A copper vessel examined was deeply saturated with oxychloride produced by the prolonged action of brackish waters. It contained 71.9 per cent. of copper, but neither tin, lead, antimony, zinc or iron in appreciable proportions. A ring accompanying the vessel is formed of a plumbiferous bronze.—Compt. Rend., cxviii., No. 15.

Slow Changes in Objects of Copper both Buried in the Earth and Preserved in Museums.—M. Berthelot. The alterations are due to the initial presence of sodium chloride and of atacamite, whilst a proportion of metallic copper equal to that which was present in the atacamite in the state of cupric oxide passes into the cuprous state. All these reactions are exothermic. We have a cycle of reactions indefinitely recurring which destroys metallic copper buried in moist earth, and converts it into cuprous oxide.—Compt. Rend., cxviii., No. 15.

FLUORINE.

Fluorides of the Alkaline Earths.—C. Poulenc describes two new processes for obtaining anhydrous and crystalline fluorides of the alkaline earths. In the first he acts upon an amorphous fluoride with a mixture of potassium fluoride and chloride, and, in the other, upon potassium fluoride with a chloride.—Jour. Pharm. Chim., 1893, 215.

GOLD.

Colloidal and Soluble Form of Gold.— Schottlander describes a colloidal form of gold which is completely soluble in water in the presence of basic cerium acetate. In somewhat concentrated solution the color is a deep violet-red, but in attenuated solution the color is carmine-red. So powerful and intense is the coloring property of the substance that a solution carrying only 0.000002 part is still markedly rose-red. The material is obtained by boiling together aqueous solutions of gold-chloride, cerous acetate and sodium hydrate in definite proportions. It may also be obtained by mixing gold and a cerous salt, and precipitating, by means of sodium or potassium hydrate in solution. The precipitate, on drying, is a brilliant bronze-colored mass, which contains all the gold and a small proportion of cerous acetate, and is freely soluble in water in all parts. Schottlander thinks the preparation will have a useful future in the arts.—Nat. Drug., 1894, 116.

Quantitative Estimation of Gold in Salts of Gold and Gold Baths.—A. Lanier recommends hydroxylamine hydrochloride and potassium hydroxide for the quantitative precipitation of gold, especially in the presence of alkali chlorides. On warming precipitation is complete in a few minutes. Gold is also quantitatively precipitated from its neutral or even slightly acid solutions without the addition of potassium hydroxide, in the form of shining gold scales that adhere to each other when stirred with a glass rod. From concentrated solutions it is precipitated as a brown powder. The gold may be obtained from fixing baths by the above method. Gold baths containing a cyanide are not precipitated.—Chem. Zeit. (Rep.), 1893, No. 13; from Phot. Corr., 1893, 30, 220.

Detection of Gold in Weak Solutions.—According to Rose (Pharm. Zeit. f. Russl.), if about 3 liters of a solution of 1 part of auric chloride in 100,000,000 parts of water be heated to boiling, shaken in a beaker, together with a saturated, watery, acidulated solution of chloride of tin, and quickly stirred, a bluish-purple precipitate will form, clearly distinguishable from what would be thrown down by an equal quantity of hot water alone. The presence of NaCl (3 per cent.), $CaSO_4$, KCl, KBr, N_4HCl, or free HCl, does not interfere with the reaction. The precipitate is soluble in ammonia, from which, by adding hydrochloric acid, it can be produced anew, with its color unaltered. This test is much more delicate than the usual one with purple of Cassius, and is specially recommended for examining the washings from gold ores which have been roasted with chlorides.—Drug. Circ., 1893, 153.

C. P. Gold.—Pure gold is largely employed in electrotyping. It is obtained by treating the crude metal with nitro-hydrochloric acid, from which it is precipitated by sulphate of iron, but so finely divided as not to be separated on filtering. This objection (according to R. Lueders) is obviated by the addition of a liquid hydrocarbon, such as kerosene oil, which is advantageously combined with borax or an alkali. On stirring the mixture, the gold is completely taken up by the hydrocarbon; the latter, according to its specific gravity, is deposited either above or below the other fluid, from which it can be removed, and the gold will now remain upon the filter.—Ibid., April, 1894.

HYDROGEN.

Hydrogen—Preparation of.—J. Ball notes that the addition of a few drops of a solution of either cobalt or nickel nitrate to the acid and zinc in a hydrogen apparatus accelerates the evolution of gas enormously.—Chem. News, 1893, 184.

Hydrogen Peroxide Solution—Researches Regarding.—Squibb publishes (Ephemeris, January, 1894,) an elaborate account of experiments performed with hydrogen peroxide solution, with a view to ascertaining the best mode of preparation, and to determine its keeping qualities.

It was found by these experiments that at ordinary temperature, and with ordinary agitation, the dioxide in the solution is likely to be all practically decomposed in about eight weeks' time. Pressure exerted no discoverable influence on this change. Weak bottles may burst if securely corked, but the packing bottle of ordinary strength is able to withstand all the pressure developed from its contents.

The author endeavored to find a preservative agent, but was unsuccessful. Boroglyceride retarded decomposition, but would not prevent it. When protected with this agent, and kept at a low temperature, the solution lost only about one-fifth its strength in eight months, but decomposition then became more rapid, and the preparation was practically worthless at the end of the year.

The result of these experiments is the recommendation of the extemporaneous preparation of the solution as required for medicinal use. Any solution, new or old, should be assayed near the time of its use to determine its actual strength. Such preparation and directions for assay are now provided by the Pharmacopœia, presumably as the result of the investigation named. Several other important facts were brought out during this investigation, one of which is that the solution when exposed to the air at the ordinary temperature, or when heated (on a water-bath) at a temperature not exceeding 140° F., looses chiefly water, and it can thus be concentrated so as to contain 50 volumes of the dioxide. When rapidly heated the solution is liable to sudden decomposition (so only small quantities should be experimented on, the heat being carefully applied and regulated). Decomposition is accelerated by the presence of angular particles of dust. Thenard long ago succeeded in concentrating the solution in vacuo. It was first observed by Squibb, however, that the solution left in an open vessel became stronger instead of weaker.

It was further found that the solution may be partially concentrated by freezing ; the ice being removed, abstracts only water. Tests for impurities and assay to determine strength are detailed in the paper referred to ; but these are now provided also by the Pharmacopœia. The following additional assay process given by the author, may, however, prove useful to those who may not have at hand the usual assay apparatus. Weigh off, upon a counterbalanced paper, 0.28 Gm. (0.28145), or 4⅓ grains (4.34334) of clean crystals of potassium permanganate. Then counterbalance a clean, dry, glass-stoppered, two-ounce vial, put the permanganate in it, and make the weight up to 50 Gm. or 772 grains, with water, very cautiously added toward the last. Then shake the vial until the permanganate is all dissolved. Next, take a very small beaker and a glass stirring rod, and put into the beaker 15 C.c., or half a fluid ounce of diluted sulphuric acid (1 to 10) and counterbalance the whole with shot and pieces of paper. When accurately counterpoised, put a 1 Gm. weight, or 15½ grains, in the weight scale, and add to the contents of the beaker, from the solution to be tested, drop by drop, until the balance is restored, and exactly 1 Gm., or 15½ grains, of the solution has been added to the contents of the beaker. This is by far the most particular part of the process, and the last few drops should be added with a dropping tube, and not by pouring in, as it is necessary to weigh to half or quarter of a drop. Then take off the gram or grain weights that have been used, and restore the counterpoise by shot and paper. Then take the beaker off the scale, and add to its contents, drop by drop, with constant stirring, permanganate solution from the vial, until a drop falls in that is not entirely dissolved on stirring, but gives the solution a permanent pink tint. Then return the beaker to the scale and counterbalance it exactly with weights on the other pan. Then each gram or each 15½ grains required indicates one volume in strength of the solution tested. For example, if 10 Gm. or 155 grains are required on the weight-pan, then the solution is of 10 volume strength.

Hydrogen Peroxide—Preparation of.—P. Shiloff. Sodium carbonate is added to the commercial 3 per cent. aqueous solution of hydrogen peroxide, until the reaction is distinctly alkaline. The solution is then filtered, and shaken up for 3 to 5 minutes with 10–12 times its volume of ether, which extracts about half of the hydrogen peroxide originally present, and leaves behind most of the impurities. The ethereal layer is separated and reduced to 0.01–0.0025 of its orginal volume on the water bath. The remainder of the ether is removed in a bell-jar by solid paraffin. The loss of hydrogen peroxide during the evaporation of the ether is only 7–10 per cent.

Operating in this way, the author obtained (*a*) a colorless solution with distinctly acid reaction, and sp. gr. 1.1756, which contained 54 Gm. of anhydrous hydrogen peroxide in 100 C.c.; (*b*) a thick, transparent, slightly yellow, acid liquid, of sp. gr. 1.2475, which contained 79.6 Gm. of hydrogen peroxide in 100 C.c.—Jour. Russ. Chem. Soc., 1893, 293; Jour. Chem. Soc. (Abs.), 1894, 186.

Atmospheric Hydrogen Peroxide—Source of.—A. Bach has been led to the conclusion that carbonic acid in sunlight undergoes decomposition into per-carbonic acid, and the elements of formaldyhyde, according to the equation:

$$3H_2CO_3 = 2H_2CO_4 + \overline{|C + H_2O} \,.$$

The per-carbonic acid may afterwards decompose into carbonic anhydride, and hydrogen peroxide, $H_2CO_4 = CO_2 + H_2O_2$. To these reactions, he attributes the presence of hydrogen peroxide in the atmosphere.—Ber. d. Chem. Ges., 1894, 340.

Occurrence of Hydrogen Peroxide in Atmospheric Air and in Atmospheric Waters.—E. Schöne. A reply to Iloswa, who published in Bull. Soc. Chim. ([3], 2, 347, 351, etc.), a series of articles seeking in general to prove that no hydrogen peroxide, and also no ozone, occur in the air, and in its downfalls.—Ber. d. Chem. Ges., 1893, 3011; Chem. News, 1894, 137, etc.

Production of Hydrogen Peroxide During the Spontaneous Oxidation of Zinc—Combustion by Oxygen.—M. Traube has already shown that small quantities of hydrogen peroxide are formed by the slow oxidation of zinc and other metals. This fact leads him to the view that during the slow oxidation of zinc, the water, and not the oxygen, is dissociated. The reaction may be represented as taking place in two stages, (1) $Zn + 2H_2O + O_2 = Zn(OH)_2 + H_2O_2$; (2) $Zn + H_2O_2 = Zn(OH)_2$.—Ber. d. Chem. Ges., xxvi., 1471–1475.

Constitution of Hydrogen Peroxide and of Ozone.—M. Traube. In the first portion of this paper the author upholds his view that hydrogen peroxide is a compound of 1 molecule of oxygen and 2 atoms of hydrogen. Hydrogen peroxide acts as an oxidizing agent only towards powerfully reducing substances, such as zinc and sulphurous anhydride, with which it unites as $(OH)_2$. Schoenbein states that it does not react immediately with phosphorous acid or phosphorus. Weltzien found that a solution of hydrogen peroxide placed over phosphorus did not alter in titre after two months, and, according to Lustig, hydrogen peroxide has no action on alcohol, even in presence of dilute sulphuric acid. Hydrogen peroxide, in a very dilute solution, only slowly liberates iodine from potassium iodide, and the author finds that it does not oxidize normal potassium oxalate, even when boiled with it. If hydrogen peroxide consisted of two hydroxyl groups, it ought to be obtained by the electrolysis of barium hydroxide, but no trace of it appears at the anode, only active (atomic) oxygen.

Hydrogen peroxide and ozone are closely related, and the author assigns the formulæ "$2H.O{=}O$" and "$O.O{=}O$" to them respectively. In support of this formula for ozone it is urged that in its reactions only 1 atom of oxygen is active, the others being evolved as ordinary oxygen.

Potassium tetroxide is a reducing agent towards acid solutions of permanganate, and decomposes directly into hydrogen peroxide when treated with acid, without giving rise to active oxygen, for if the decomposition takes place in the presence of indigosulphonic acid the latter remains unaltered. The author, therefore, represents it thus, "$K.O{=}O.O{=}O.K.$"

The author has already elsewhere proposed the name holoxides for compounds of the type of hydrogen peroxides.—Ber. d. Chem. Ges., xxvi., 1476–1481.

Metallic Separation in Alkaline Solutions of Hydrogen Peroxide.—Experiments concerning the influence of organic substances (such as tartaric acid) upon the precipitation of copper by hydrogen peroxide, recently instituted by P. Jannasch (Ber. d. Chem. Ges., 1893), yielded the following results: (1) A mixture of 2 C.c. of cupric sulphate solution, 3 C.c. tartaric acid solution, 4 C.c. soda solution, and 15 C.c. hydrogen peroxide at 2 per cent., gives on cooling, after a momentary effervescence, an abundant deposit of bright-red granular cuprous oxide. (2) 2 C.c. of copper-sulphate solution, 1 C.c. tartaric-acid solution, 1 C.c. soda solution, and 10 C.c. hydrogen peroxide, give, after boiling until the restoration of the blue color, a reddish-brown flocculent deposit; whilst the liquid is decolorized. (3) 2 C.c. of copper-sulphate solution, 1 C.c. tartaric acid solution, 0.5 C.c. soda solution, and 5–10 C.c. hydrogen peroxide, yield a flocculent pale-green deposit, which, on prolonged standing, becomes a heavy yellow sediment, with fine, light-blue supernatant flakes. (4) 2 C.c. copper-sulphate solution, 1 C.c. tartaric-acid solution, 0.5 C.c. soda solution, and 15 C.c. hydrogen peroxide, give a light-blue precipitate, unchanged by boiling.

Hydroxyl and Its Compounds, Especially with Carbon.—Chas. Turner in Brit. and Col. Drug.; Nat. Drug., 1894, 91.

Electrolytic Decomposition of Water.—M. L. Blanc in this paper upholds the view of the primary decomposition of water, and replies to the objections brought forward by Arrhenius. The increase in the electrolytic decomposition of water by the addition of an electrolyte is explained, not by an increase in the degree of dissociation of the water, but in the capability of ion formation. He also explains the fact that hydrogen is not immediately liberated during the electrolysis of an alkali salt with a mercury cathode, by stating that the potassium ions give up their electricity to the mercury more readily than the hydrogen ions. That hydrogen ions are present in water is shown also by the fact that potassium reacts readily with water and not with parraffin. In the case of solution of various metallic cyanides in potassium cyanide, he points out that cadmium is easily separable, but platinum scarcely so, which is hard to explain on a secondary decomposition hypothesis, unless the electro-deposited platinum were soluble in potassium cyanide; this, however, he proves experimentally is not the case. He finally points out that the primary decomposition theory has the advantage of simplicity.—Zeit. physikal. Chem., 1894, 161; Jour. Chem. Soc., (Abs.) 1894, 224.

IODINE.

Preparation of Pure Iodine and Some of its Properties.—According to O. Meinecke (Chem. News, 1893, 272), perfectly pure iodine, in which foreign constituents can no longer be detected, may be obtained by precipitating a concentrated solution of iodine in potassium iodide, with water, or by precipitation with sulphuric acid from a solution containing potassium iodide and iodine. For proceeding according to the first method, a solution of potassium iodide in two parts of water is saturated with powdered iodine, and water is then added until a small portion of the iodine is deposited. After twenty-four hours it is decanted, and water again added to the clear solution. The precipitates are thoroughly washed and dried over calcium nitrate. For the second method, a solution containing equal quantities of potassium iodate and of potassium iodide, is directly precipitated with dilute sulphuric acid; the precipitate is washed until the filtrate ceases to react with sulphuric acid, and dried over sulphuric acid. The iodine obtained according to each method is sublimed twice with and twice without barium oxide. The second method is said to yield a pure product even in presence of bromine, chlorine, and cyanogen; whilst in the first method, to avoid contamination with cyanogen, it is advantageous to add a little hydrochloric or sulphuric acid. For working up solutions containing iodine residues (including titration residues), the author acidifies and oxidizes with potassium permanganate, until brown manganese peroxide is deposited, which is separated from the iodine by decantation. After washing, it is further purified as above directed. Further experiments of the author relate to the purification of impure iodine. The first method, sublimation with potassium iodide, yields a pure product at once if the impurities are small. If the quantities of foreign matter are larger, the sublimation must be repeated, and the purity of the iodine obtained must always be ascertained analytically. In any case, the iodine must be finally sublimed without addition. Musset's process consists in bringing the iodide to melt in a concentrated solution of potassium iodide, from which latter product it must be separated by repeated sublimation. Instead of the solution of potassium, Meinecke uses a solution of calcium chloride of specific gravity 1.370, adding to this liquid a few grammes of potassium iodide and a little hydrochloric acid, so that the liquid has a brown color. The mixture is heated to the melting-point of iodine, and kept at this heat for five minutes. The iodine is washed out and sublimed once alone and once with barium oxide, when it is nearly pure. The removal of cyanogen is complete, that of bromine and chlorine less so. The quantity of the latter is so slight that a single sublimation suffices for its entire removal. The author has made careful experiments on the hygroscopic character of iodine.

Volumetric Determination of Iodine, etc.—In order to obviate the inconvenience of having to make frequent trials of thiosulphate solution in the determination of iodine, iodic acid, or iodates, Vitali proposes to make use of the reaction between iodine and sulphurous acid in the presence of water:

$$SO_2 + I_2 + 2H_2O = 2HI + H_2SO_4.$$

and then to determine the acidity with a normal soda solution. On passing sulphurous acid into water in which iodine is suspended, one molecule of sulphurous anhydride gives rise to two molecules of hydriodic acid, and one molecule of sulphuric acid. The total acidity produced in this case corresponds to four molecules of a monobasic acid, each molecule representing $254/4 = 63.5$ iodine. One cubic centimetre of normal soda solution will therefore represent 0.0635 of iodine. The experiment is conducted by adding to the iodine solution, drop by drop, a very dilute solution of sulphurous anhydride until a faint yellow color is produced. Starch solution is then added, and sulphurous anhydride passed into the liquid until the blue color disappears. After adding some drops of phenopthalein solution, titrate for acidity with normal soda, and the number of cubic centimetres used give the quantity of iodine when multiplied by 0.0635. To obtain exact results it is necessary to have the iodine solution neutral, and the sulphurous anhydride solution free from sulphuric acid. Subject to the same conditions, chlorine or bromine may be determined by the same method, the end of the reaction being indicated in the case of bromine by the complete disappearance of color in the liquid, and in the case of chlorine by the non-production of blue color when a drop of the liquid is tested with starch paste containing potassium iodide. In the determination of iodic acid, the reaction taking place is represented by the following equations:

$$5SO_2+2HIO_3+4H_2O=2I+5H_2SO_4, \quad \text{and} \quad SO_2+2I+2H_2O=2HI+H_2SO_4.$$

Two molecules of iodic acid give rise to the formation of six molecules of sulphuric acid and two of hydriodic acid, so that the total acidity corresponds to fourteen molecules of a monobasic acid, each molecule indicating 352/14 = 25.142 iodic acid, and each C.c. of normal soda representing 0.025142 iodic acid. In the determination of iodates the calculation has to be somewhat different, as shown by the following equations:

$$5SO_2+2KIO_3+4H_2O=K_2SO_4+2I+4H_9SO_4, \text{ and } SO_2+2I+2H_2O=H_2SO_4+2HI.$$

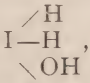
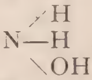
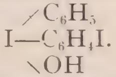
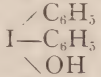
In this case the total acidity produced is equal to only twelve molecules of monobasic acid instead of fourteen, each molecule indicating 428/12 = 35.666 potassium iodate.—Bolett. Chim. Farm, 1894, No. 4, through Apotheker Zeitung, No. 17.

Determination of Iodine.—Villiers and Fayolle separate and determine the amount of hydriodic acid in the presence of chlorides and bromides by adding to the solution (free from nitric acid) carbon bisulphide and an excess of ferric perchloride free from chlorine. After agitation the bisulphide is decanted and replaced by fresh until it is no longer colored, four washings generally sufficing. By washing with a little water the separated bisulphide is then freed from traces of iron salt, after which the dissolved iodine is immediately titrated by means of sodium thiosulphate. The whole operation is performed in a special apparatus consisting of two separating funnels, one placed above the other. The two stop-cocks being opened, a sufficiency of water is drawn into the lower funnel by aspiration, and the bottom stop-cock is closed. A few drops of carbon bisulphide are then allowed to fall into the upper funnel and volatilized by the heat of the hand, so as to displace a certain volume of air, after which the upper stop-cock is also closed and the bisulphide, the liquid to be tested, and the ferric perchloride solution, are poured into the upper funnel, which is afterward closed with a glass stopper so as to permit of the whole apparatus being agitated.—Compt. rend., cxviii., 1332.

To Detect Iodine in the State of an Iodide or Iodate.—G. Deniges makes use of the ingenious process of Suilliot and Raynaud for the preparation of iodoform, which consists of adding an alkaline hypochlorite to an iodide in the presence of acetone, and claims that by using these same reagents very small quantities of iodine can be detected either directly or by means of the microscope. In the case of an iodide, the solution, if it is not a base of potassa or of soda, is precipitated by neutral sodium carbonate and filtered; to several C.c. of the filtered liquid is added one drop of solution of caustic soda, or sufficient to render it slightly alkaline, then 5 or 6 drops of a 10 per cent. aqueous solution of acetone, and followed by an alkaline hypochlorite, such as the commercial solution of chlorinated potassa, added drop by drop. If an iodide is present, even in very slight proportion, a whitish cloudiness is observed, which soon concentrates to clear yellow granulations of iodoform. If the result is to be confirmed microscopically, a portion of the deposit is placed on a glass slide, together with one or two drops of the liquid, or else of water, covered with a thin glass, and carefully heated to near the boiling point of the liquid. Upon cooling, the microscope will reveal the hexagonal prisms and derivative forms of iodoform. In the case of iodate this is first reduced to the state of an iodide by the addition of a drop of sodium bisulphite at 40° B. before applying the process.—Jour. Pharm. Chim., 1893, 499.

Iodine Monochloride.—S. Tanatar describes the method of preparing β-modification.—Jour. Russ. Chem. Soc., 1893, 97; Jour. Chem. Soc. (Abs.), 1893, 514.

Preparation of Pure Potassium Iodate.—M. Gröger. 40 Gm. of pure potassium permanganate is dissolved in 1 litre of hot water, 20 Gm. of potassium iodide dissolved in a little water is added, and the whole heated in a boiling water-bath from 20 to 30 minutes, when the excess of permanganate is reduced by the cautious addition of alcohol. The filtrate is acidified with acetic acid, and evaporated to about 50 C.c. The mother liquor is poured off, and the crystals of potassium iodate are washed with strong alcohol and dried.—Zeitschr. f. Angew. Chem., 1894, 13.

Basic Compounds of Iodine.—Victor Meyer and Hartmann have prepared a new substance of a somewhat surprising nature, the first member, in all probability, of an extensive series. It is astonishing to learn that a compound has been obtained containing iodine as a central, predominating or grouping element, which not only contains that element acting in a trivalent capacity exactly like nitrogen in ammonia, but which is a powerful base, combining with acids to form well defined salts with elimination of water, precisely as when a caustic alkali is neutralized by an acid. This remarkable new iodine compound is derived from an as yet unisolated base  $I\begin{matrix}\diagup H\\ -H\\ \diagdown OH\end{matrix}$, similarly constituted to hydroxylamine  $N\begin{matrix}\diagup H\\ -H\\ \diagdown OH\end{matrix}$. The substance itself is represented by the formula  $I\begin{matrix}\diagup C_6H_5\\ -C_6H_4I\\ \diagdown OH\end{matrix}$. The pure diphenyl derivative  $I\begin{matrix}\diagup C_6H_5\\ -C_6H_5\\ \diagdown OH\end{matrix}$ has likewise been isolated, but further particulars of it are reserved for a subsequent communication.

Meyer was led to suspect the possibility of the existence of such a compound from the fact that the oxy-iodine derivative of benzoic acid, the so-called iodoso-benzoic acid, $C_6H_4(IO)(COOH)$, exhibits a very much feebler acid character than ordinary iodo-benzoic acid, $C_6H_4I.COOH$, and partakes indeed more of the character of a phenol, indicating that the group IO is endowed with basic instead of acid properties. This supposition, moreover, is confirmed by the remarkable observation of Willgerodt, who has shown that the analogous derivative of the hydrocarbon benzene itself, iodoso-benzene, $C_6H_5.IO$, forms a series of well-defined salts with acids. Hence it would appear that the compound H.IO, as yet unisolated, cannot be called hypo-iodous acid, for it is apparently a basic substance, and not an acid at all. An attempt was therefore made to saponify iodoso-benzene by boiling it with dilute sulphuric acid, in order to convert it, if possible, into phenol and the sulphate of the supposed base. Dilute sulphuric acid readily dissolves iodoso-benzene with formation of a sulphate, as shown by Willgerodt, but on mere boiling it still exhibits the reactions of iodoso-benzene. Upon evaporation of the solution, and warming for several hours over the water-bath, however, it loses its capability of liberating iodine from potassium iodide, and a sulphate of a basic substance is indeed found to have been produced.—Ber. d. Chem. Ges., 1894; West. Drug., 1894, 214.

Chlorine in Iodine.—For the detection and determination of chlorine in iodine, Ulzey and Friedrich have devised a very easily applied test. 10 to 20 Gm. is dissolved in 100 C.c. of carbon disulphide and the solution introduced into a separator. 5–10 C.c. of water is added, and, after being well shaken, drawn off; this aqueous portion contains the chlorine as iodine chloride, and is titrated with standard solution potassium iodide. As long as a turbidity occurs after each addition, some iodine chloride is still present; when no more cloudiness occurs the reading must be taken. —Ibid., 99.

Starch Paste for Iodometric Determinations.—C. Meinecke recommends to prepare the paste with the starch of potatoes, sago, arrowroot, or tapioca, and not with the starch of grain, such as wheat or rice. Grain starches give, at the end of the operation, a violet or even reddish brown coloration, whilst potato-starch gives a pure blue color.—Rev. Univ. Mines Met., xxv., No. 3; Chem. Zeit., 1894.

IRON.

Chlorobromide of Iron.—At normal temperature and under ordinary pressure a combination of bromine and anhydrous protochloride of iron is effected only after a month or more of contact. However, using a sealed tube, operating at about 100° C. and using an excess of bromine (10 C.c. to about 2 Gm. protochloride of iron) crystals begin to appear after 24 hours; after about five days all the protochloride of iron is transformed into a volatile, crystalline product, which excess of bromine will not again dissolve.

This product was estimated by removing the uncombined bromine in a current of dry carbonic acid, and calculating the iron as the sesquioxide; the bromine and chlorine were estimated by the method of H. Rose; that is, submitting a mixture of silver bromide and chloride to a current of dry chlorine, and calculating the bromine by loss:

Calculated. Fe_2Cl_2Br.	Found		
Fe = 27.05	27.25	27.19	27.13
Cl = 38.65	39.09	38.69	38.80
Br = 34.30	33.61	33.98	34.03
100.00	99.95	99.86	99.96

The crystals are green by reflected light and perfectly opaque; the system of crystallization could not be determined. They are very deliquescent, and very soluble in water; the solution in the smallest possible quantity of water is accompanied by a notable disengagement of heat. Solution in ether is a test of purity, the protochloride of iron remaining undissolved. It is also soluble in alcohol, chloroform, benzin and toluene; insoluble in carbon bisulphide. It loses some bromine at ordinary temperatures, and at the temperature of the Bunsen flame loses nearly all of it, leaving a residue of anhydrous protochloride of iron.—M. C. Lenormand, in Jour. Pharm. Chim., 1893, 503.

Iron Nitride.—G. J. Fowler (Chem. News, 1893, 152), states that the best way of preparing iron nitride is as follows: Iron is reduced from the hydrate by hydrogen, in a tube of such dimensions that it can be weighed, together with its contents, and thus the end of the reaction determined without exposing the iron to the air. When complete reduction has been effected, the iron is heated in a fairly rapid current of ammonia gas, until no further increase in weight is observed. The temperature should be kept a little above the melting-point of lead. The product obtained when the reaction was complete was analyzed. The nitrogen was determined by dissolving the substance in hydrochloric acid, evaporating with platinum chloride, and weighing the ammonium-platinum chloride obtained. The hydrogen given off on solution of the substance in sulphuric acid, was measured. The iron was determined by ignition and weighing as oxide, and by solution in sulphuric acid and titration with permanganate. The nitride thus prepared, has a composition corresponding to the formula Fe_2N. It is a gray powder, rather less blue in tone than iron reduced from the hydrate. On rubbing, it is gritty. It is feebly magnetic. Heated in hydrogen, ammonia is produced at about the same temperature as that at which the nitride is formed. It readily burns in chlorine, ferric chloride and nitrogen being formed. Heated in carbon monoxide, no evidence of the formation of cyanogen compounds could be obtained. Steam at 100° C. slowly oxidizes the nitride, with evolution of ammonia. Hydrogen sulphide begins to react with it at 200° C. forming ammonium sulphide and sulphide of iron. Heated in nitrogen to the boiling-point of sulphur, no change occurs. The temperature at which nitrogen is evolved by the action of heat alone must, therefore, be above this point. An ethereal solution of iodine is without action upon the nitride. From a slightly acidified solution of copper sulphate, nitride of iron deposits copper. Heated with ethyl-iodide to 200° C. in a sealed tube, olefines are formed, and iodides of iron and ammonium, the reaction evidently being,

$$5C_2H_5I+Fe_2N=2FeI_2+NH_4I+5C_2H_4+H.$$

Heated similarly to 200° C. with phenol, no reaction occurred. Treated with mixture of hydrogen peroxide and sulphuric acid, analyses showed that very little, if any, of the nitrogen is oxidized, the whole dissolving, as usual, to form ammonium sulphate.

Phosphates of Iron and Alkaloids—Examination of Commercial Preparations of.—M. F. Schaak has devised the following process for the examination of these commercial preparations:

Five to ten Gm. were taken, diluted with water, heated to expel alcohol, put into a separating funnel, ammonium citrate added (when needed), made alkaline with sodium hydrate and shaken with 3 or 4 successive portions of chloroform until all the alkaloids were removed. The combined chloroform solutions were allowed to evaporate, and the residue dried at 100° C. for one hour, and weighed as total alkaloids. A portion of this alkaloidal residue indicated quinine by the fluorescence of the acid solution, the thalleioquin reaction, and the formation of a precipitate by ammonia water, soluble in excess. Strychnine was indicated by moistening a film of the residue with H_2SO_4 and adding a minute fragment of potassium dichromate, when a fading purple color resulted. The liquid from which the alkaloids had been removed, after being heated to expel remaining chloroform, was treated with a little ammonium chloride, and ammonium sulphide added in excess, the bottle completely filled, corked and set aside until the supernatant liquid acquired a yellow color without a tinge of green. The precipitate collected upon a filter and washed with dilute ammonium sulphide, with precautions against oxidation, was dissolved in dilute HCl, the solution heated, filtered and thoroughly oxidized with small quantities of nitric acid. This ferric solution was strongly acidulated with hydrochloric acid and a little copper sulphate and potassium sulphocyanate added. Decinormal volumetric solution of sodium thiosulphate was now run in until the red color of the liquid was discharged, a little starch paste added, and the excess of sodium thiosulphate determined by a corresponding strength solution of iodine. The iron was calculated from the amount of sodium thiosulphate used.

The phosphoric acid was precipitated as ammonium magnesium phosphate, by adding magnesia mixture to the ammoniacal liquid, from which the iron had been removed (the ammonium sulphide not interfering); after the precipitate had thoroughly separated, it was washed with ammoniacal water and dissolved in a small quantity of acetic acid and sodium or potassium hydrate added, allowing the solution to remain slightly acid. After the addition of a few drops of cochineal test solution, heat was applied and volumetric solution of uranium acetate run into the hot liquid, until a small excess of uranium, producing a green color with the cochineal indicated the end of the reaction.

The uranium solution having previously been standardized under similar conditions, the phosphoric anhydride was calculated from the amount used. Several samples of the scale phosphate of iron, treated according to the above, gave an average of 13.2 per cent. iron and 17 per cent. phosphoric anhydride. The following table shows the specific gravity and aver age result of several analyses of each preparation of elixir phosphate of iron, quinine and strychnine, syrup phosphate iron, quinine and strychnine, and several chemical foods. All the elixirs claimed to contain 2 grains phosphate of iron, 1 grain salt of quinine and $\frac{1}{100}$ to $\frac{1}{60}$ grain strychnine.

Number.	Specific Gravity.	Per cent. Fe.	Per cent. P_2O_5.	Total Alkaloids.
1	1.17	.39	.52	1.33
2	1.09	.32	.20	.79
3	1.06	.26	.22	.30
4	1.12	.40	.15	1.80
5	1.06	.37	.45	.20
6	1.08	.37	.43	.60
7	1.09	.17	.29	.70
8	1.14	.45	trace	1.35
9	1.08	.36	trace	1.16
10	1.30	.034	3.00	.44
11	1.34	.31	.27	—
12	1.18	.34	.25	—

No. 1, made by the writer, contained 2 grains scale phosphate of iron, 1 grain quinine sulphate and $\frac{1}{60}$ Gr. strychnine to a fluid drachm.

This preparation formed a precipitate when mixed with water, and, on being exposed to light, gradually became darkened in color.

No. 2, a commercial preparation labelled to contain same as above, was of a light greenish color, and clouded slightly on addition of water.

Nos. 3, 4, 5 were of light greenish color and mixed with water without precipitation. No. 4 was stated to contain half the amount of iron as citro-chloride, and the alkaloid quinine.

Nos. 6 and 7 were dark colored, and did not precipitate when mixed with water.

Nos. 8 and 9, made by prominent manufacturers, are considered standard preparations. They did not precipitate on standing, and were miscible with water ; 9 was a beautiful elixir of bright green color, and enjoys perhaps a larger sale than any other ; it was labelled to contain the full quantities of ingredients.

No. 10 was a syrup, and labelled to contain 1 grain phosphate of iron, ¼ grain muriate of quinine, other phosphate and free phosphoric acid to a fluid drachm.

Nos. 11 and 12 were chemical food or syrup of phosphates, and should contain 1 Gr. phosphate of iron to each fluid drachm.—Amer. Jour. Pharm , 1894, 179.

Molecular Weight of Ferric Chloride.—In boiling alcohol and ether the molecule of ferric chloride corresponds to the formula $FeCl_3$. The movement of this substance is comparable to that of acetic acid, the vapor of which at 130° contains a great number of double molecules, and which, nevertheless, at 0° in water contains a simple molecule.—Brit. and Col. Drug., 1894, 414.

New Method for the Production of Sodium and Potassium Ferrocyanides.—The alloy known as "zinkeisen," produced by the action of ferrous chloride upon metallic zinc, is being experimented with by H. N. Warren (Chem. News, 1893, No. 1762,) as a reducing agent for the sulphocyanates. The potassium or the sodium salt is procured by the action of ammonia upon carbon disulphide dissolved in petroleum. If this mixture is kept below 100° C. there is produced ammonium sulphocarbamate, which, if briskly boiled for a short time, is resolved into ammonium sulphocyanate, this being afterward converted into its equivalent of either potassium or sodium salt by the introduction of either of those bases, and the ammonia thus evolved being collected in the usual manner and employed in a further operation. If the calcined sodium or potassium salt thus prepared is intimately mixed with an equivalent proportion of the zinc alloy and heated to redness the sulphur present is gradually absorbed by the zinc, whilst the iron remains for the production of the ferrocyanide. The mass thus obtained is lixiviated and evaporated, the ferrocyanide crystallizing out as the liquid cools, and capable of being further purified by recrystallization.

Bromoborates of Iron and Zinc.—It has recently been shown by G. Rousseau and H. Allaire (Compt. Rend., cxvi., 1445), that magnesium in boracite can be replaced by iron, zinc, or any other metal. The chloroborate of iron was thus obtained in transparent cubes of a greyish color and the formula $6\ FeO,\ 8\ B_2O_3,\ FeCl_2$, slowly soluble in nitric acid, and rapidly decomposed when fused with alkali carbonates. It was further found that the chlorine of the boracite could be replaced by bromine, iodine or fluorine ; and thus was obtained the bromoborate of iron as a powdery mass of cubes and tetrahedrons which dissolve slowly in warm nitric acid. The composition of the crystals is said to correspond to the formula $6\ FeO,\ 8\ B_2O_3,\ FeBr_2$, and to contain also a small quantity of calcium oxide. The bromoborate of zinc—$6ZnO,\ 8B_2O_3,\ ZnBr_2$—was obtained in microscopic white crystals.

New Process for Saccharated Oxide of Iron.—The following is proposed by Keutmann (Int. Pharm. General Anz., 1893, 214): Dissolve ferrous sulphate in water, precipitate with diluted ammonia water, having the bottle filled to the stopper. Stop tightly and allow to settle; draw off the supernatant water by means of a siphon and fill immediately with hot water, repeating the operation until the wash-water no longer gives a sulphate reaction. Then place the precipitate in a porcelain dish containing the pulverized sugar, warm, add a small quantity of alkali and oxidize the ferrous oxide with hydrogen peroxide —Chem. Zeit., 1893 (Rep.), 229.

Aluminum in Ferro-aluminum.—H. V. Juptner, (Oest. Zts. Berg. u. Hutt., xli., 110), describes his method, which is practically the old one—precipitating and weighing Fe_2O_3, Al_2O_3 and P_2O_5 together, and in aliquot parts determining Fe and P_2O_5, estimating Al by difference.

Neuhausen's method consists in dissolving 5 Gm. in dilute H_2SO_4, evaporating to dryness, taking up with dilute H_2SO_4 diluting to 300 C.c., reducing with iron wire, neutralizing with Na_2CO_3 and pouring into a mixed boiling solution of KOH and KCy. After filtering, the solution containing the Al is heated for an hour with addition of NH_4NO_3, and the $Al_2(OH)_6$ filtered off. This precipitate must be tested for KOH and for Fe.

Dichromate Titration of Iron.—Mahon notes the following facts: When iron ores are brought into solution by fusion with alkali carbonates in a platinum crucible, and subsequent solution in HCl, some Pt may be attacked by the flux and thus brought into the solution. In that case, when the titration of the iron is reached, the $SnCl_2$ first reduces the Fe, and afterwards the $PtCl_4$ to $PtCl_2$, giving first a colorless solution, and afterward a colored one. On titrating, some error is thus introduced. If the amount of $SnCl_2$ added is so regulated that the addition is stopped when a colorless solution is first obtained, the difficulty may be avoided.—Am. Chem. Jour., 1893, 578.

Titration of Iron by $SnCl_2$.—Mahon (Am. Chem. Jour., xv., 360). In solution of Fe_2Cl_6 containing $HgCl_2$, strongly acid with HCl, when nearly boiling, $SnCl_2$ reduces the iron first; any excess then reduces the $HgCl_2$, the Hg_2Cl_2 at first forming going into solution. If, however, a small amount of $PtCl_4$ is present, the Hg_2Cl_2 will react with it and give a dark cloud of Hg and Pt. The author, therefore, proposes as indicator a solution containing 34 Gm. $HgCl_2$ and 0.05 Gm. Pt as chloride per litre. 15 C.c. of this indicator solution should be used for each titration, which should be conducted in a flask at or near the boiling temperature, that the strong HCl fumes may keep at a distance the oxygen of the air. The bulk of solution most convenient is about 200 C.c., in which 0.2 C.c. of $SnCl_2$ in excess will give a decided cloud with the indicator.

Iron by an Iodometric Method.—Nihoul (Rev. Univ. des Mines, etc., xxi., No. 1), has devised a method for the determination of iron based on the reaction of Fe_2Cl_6 with KI or HI. The solution of ferric iron dissolved in HCl (which, if it contains ferrous iron, must be oxidized by $KClO_3$ and the Cl expelled by heat) is treated with KI or HI in a flask filled with CO_2 (a current of which gas is maintained throughout the distillation) in a flask connected with a Volhard flask containing KI. The reaction occurring is $Fe_2Cl_6 + 2KI = Fe_2Cl_4 + 2KCl + I_2$ or 1 part I = 0.4416 Fe. The I is driven over into the KI, the solution cooled in a current of CO_2 and then titrated with standard $Na_2S_2O_3$. The KI in the iron solution obstinately retains some I. This difficulty can be remedied by passing in a current of HCl gas, or by using HI instead of KI. A non-oxidizing atmosphere in the flask (CO_2) during distillation and cooling is absolutely essential.

Volumetric Determination of Ferric Salts.—W. Duncan suggested that this might be done by determining the amount of iodine liberated from potassium iodide, when brought in contact with the salt, by means of sodium thiosulphate. This method had been adopted for all ferric salts in the new U. S. Pharmacopœia and, it was more expeditious and quite as accurate as the gravimetric method. The solution of the ferric salt is acidulated with hydrochloric acid, excess of potassium iodide added, and the mixture kept for half an hour at 40° C. It is then cooled and titrated with $\frac{N}{10}$ solution of sodium thiosulphate, starch mucilage being used as indicator. The author then gave a demonstration of the method, using solution of ferric chloride containing 20 per cent. of iron. The result calculated out gave 20.08 per cent.—Pharm. Jour. Trans., 1894, 885.

Reducing Iron for Titration.—Storch advises the use of metallic Cu, previously washed with alcohol and ether and then with water. On warming, the reduction occurs readily. At the end-reaction the color changes from greenish-blue to violet.—Ber. d. Oesterr. Ges., 1893, 9.

IRIDIUM.

Iridium in the Arts.—Separation of the metal by Moissan, Joly and Violle by the aid of the electrical furnace. The separation of iridium and its companions of the platinum group, ruthenium and palladium, is a very simple affair, and has reduced its price from 12 francs per Gm. to less than 3 francs, and it is probable that it will go much lower, providing that the demand for it increases.

The alloy, in addition to the qualities mentioned, is harder and much tougher, and more elastic than the hardest tempered steel; is brilliant, untarnishable in the atmosphere, and, indeed, is with difficulty attacked by chemical reagents; melts only at enormous temperatures (from 5200° to 5500° F.), and is the ideal metal for surgical, chemical and biological laboratory instruments, the pendulums and regulators of chronometers, bearings of watches and other fine machinery, etc. For the bearings of fine balances it has no equal, and as it is easily deposited on other metals by electrolysis, it is now proposed to use it for plating razor blades and the edges of other cutting instruments. It has long been in use for pointing the tips of gold pens. The other metals of the group have similar qualities, and all of them have doubtlessly a brilliant and useful future before them.—Nat. Drug., 1894, 100.

LEAD.

Lead Tetracetate—Note on.—A. Hutchinson and W. Pollard. Experiments on lead tetracetate with hydrochloric acid suggest the possibility of preparing in a similar manner other per-salts of lead.—Jour. Chem. Soc., 1893, 1136.

Lead Tetrachloride.—By the action of chlorine upon lead dichloride ($PbCl_2$) suspended in hydrochloric acid, H. Friedrich (Ber. d. Chem. Ges., 1893, No. 26) obtained a solution of lead tetrachloride ($PbCl_4$), from which, by the addition of ammonium chloride, lead tetrachloride-ammonium chloride ($PbCl_4.2NH_4Cl$) was obtained. When this salt is placed in concentrated cooled sulphuric acid, a vigorous reaction sets in, with the development of hydrochloric acid, and lead tetrachloride precipitates in little yellow drops. By repeated shaking with concentrated sulphuric acid, pure lead tetrachloride is obtained as a perfectly clear, yellow, strongly refractive, heavy but limpid fluid, of the specific gravity of 3.180 at 0° C. It may be kept for some length of time under concentrated sulphuric acid. When heated, it decomposes in an explosive manner—$PbCl_2$ being given off in the form of heavy, white vapors, and chlorine being liberated. It forms a readily decomposable hydrate when admixed in the cold with a little water; while with much water, lead peroxide and hydrochloric acid are formed. When combined with a small quantity of cooled hydrochloric acid, a crystalline yellow body is formed—perhaps H_2PbCl_6.

Volumetric Determination of Lead.—Laune (Chem. News, lxviii., 211), has endeavored to render the dichromate titration more satisfactory. He finds it well to have in the solution the equivalent of 0.2 to 0.5 Gm. NaCl per 100 C.c. The dichromate solution used was of the strength 1 C.c = 0.002 Gm. Pb. Large quantities of salts in the solution are inadmissible. Any acidity must be neutralized, and $NaC_2H_3O_2$ must be added. To get a sharp end-reaction, it is advised to add nearly enough dichromate, and then heat to boiling. The precipitate then settles readily, and a drop or two of the clear solution may be taken out for the "spot test" with $AgNO_3$ solution. (Red precipitate when excess of chromate.)

——— *Estimation in Tinned Ware.*—Bayrac (Jour. Pharm. Chim., xxviii., 500). A standard solution of Na_2HPO_4 (in crystals) (11.922 Gm. per litre) is used, which is standarized by $Pb(NO_3)_2$ solution (15.99 Gm. per litre). 1 C.c. = 0.01 Gm. Pb. and should require 1 C.c. of the phosphate solution. The operation is conducted in a solution containing acetic as the only free acid. The end reaction is determined by a spot-test with a (10 per cent.) solution of KI. (Failing to show yellow PbI_2 when all Pb has been precipitated.) For tin, dissolve 1 Gm. in HNO_3; evaporate, digest the residue with 20 C.c. water and 20 C.c. of (10 per cent.) soda-lye for ten minutes, filter off, acidulate slightly with HNO_3, evaporate off the excess, add 3 C.c. of (3 per cent.) $NaC_2H_3O_2$ solution, and titrate. If much Pb is present, the test-solution should be five times as strong as the above.

Electrolytic Separation of Lead.—Kreichgauer. (Ber. d. Chem. Ges., xxvii., 315.) The most favorable conditions were found to be a solution containing 1 part of free HNO_3 (sp. gr. 1.4) to 7 parts of water. The precipitate should be washed twice with alcohol before drying and weighing. Results somewhat variable were obtained when only water was used for washing, the reason being, apparently, that the removal of all free acid by this means was not easily made complete.

Analysis of Impure Galenas.—Jean (Bull. Soc. Chim., ix., 253). Boil 25 to 30 Gm. of the pulverized ore for an hour with conc. Na_2S solution to which flowers of sulphur have been added, replacing the water as it evaporates. Filter the solution, which should contain all Sb and As. Acidify with HCl, dissolve the precipitate in aqua regia or in HCl and $KClO_3$, evaporate low; to one-fourth of the solution, add 10 C.c. $CuSO_4$ solution (containing 0.7 Gm. Cu) and titrate by Weyl's method with $SnCl_2$ (to decolorization). From the apparent amount of Cu by titration deduct Cu added, and multiply the remainder by 0.66214, which gives weight of Sb. To another fourth of the solution add tartaric acid and ammonia, and determine As by Mg precipitation.

Dry the portion insoluble in Na_2S, pulverize with NH_4NO_3 and project the mixture in small portions at a time into a crucible heated to scarcely incipient red heat. Repeat this operation until the sulphides have all been oxidized, then pulverize and digest with dilute HCl. Then dilute largely (500 C.c.) and allow to stand some time for $PbCl_2$ and AgCl to separate. Wash by decantation.

To the acid solution add a little Na_2HPO_4,NH_4Cl and an excess of ammonia and $(NH_4)_2CO_3$ to precipitate the remaining $PbCl_2$, Mn, Mg and Ca. This precipitate, mixed with the first one, is dried, and fused with Na_2CO_3, a little borax, and 1 to 2 Gm. of starch. The argentiferous lead button is weighed, and then cupelled. In the ammoniacal filtrate from the Pb, etc., the Zn and Cu are titrated together with standard Na_2S solution. HCl is then added and heat applied to dissolve the ZnS. The CuS is filtered off, the solution boiled, then rendered ammoniacal, and titrated again with standard Na_2S. This gives Zn, and the difference in the titration gives the Cu.

Analyses of Galena.—Lindemann and Motteu (Bull. Soc. Chim., ix., 812). 0.5 to 1 Gm. of the ore is triturated in an agate mortar with solution of chloride of lime, added in small quantities at a time, until about 80 C.c. have been added. Then diluted HCl is gradually added, and after complete oxidation of the ore by this means the material is transferred to a beaker, solution of chloride of lime added in quantity sufficient to precipitate all the lead as PbO_2. After washing by decantation 25 C.c. of a 50 per cent. solution of KI is added, then 30 C.c. of 20 per cent. HCl, and the I set free is titrated with standard $Na_2S_2O_3$, the solution being made up to 150 to 200 C.c. In case of the presence of Fe or Cu, the solution obtained by action of the chloride of lime is evaporated to expel Cl, etc., the Pb precipitated by H_2S, and the PbS treated as above. CuS, if mingled with the PbS, is removed by KCy before converting the lead to PbO_2.

LITHIUM.

Metallic Lithium—Preparation of.—Guntz employs a mixture of potassium and lithium chlorides, and conducts the electrolysis at a lower temperature.—Compt. rend., 1893, 732.

Lithium Salts—Purity of.—H. Bowden gives a process for determining the lithium based on that of Mayer and Merling (Zeitschr. f. Analyt. Chem., 1880, 563). The analyses are few, and, hence, unrepresentative. —Pharm. Jour. Trans., 1893, 214.

Lithium Nitrate.—D. B. Dott obtains results that seem to favor the formula of this salt being $LiNO_3.3H_2O$. Even allowing for the difficulty of obtaining a deliquescent salt free from adherent moisture, the fact of the crystallized lithium nitrate being a simple tri-hydrate appears most probable.—Pharm. Jour. Trans., 1893, 215.

MANGANESE.

Available Oxygen in Manganese Mineral.—Carnot (Compt. Rend., cxvii., 1295). In presence of an acid H_2O_2 reacts with all of the higher Mn oxides, affording twice as much oxygen as is "available" in the samples, *e. g.:*

$$MnO_2 + H_2O_2 = MnO + H_2O + O_2$$
$$Mn_3O_4 + H_2O_2 = 3MnO + H_2O + O_2, \text{ etc.}$$

By treating the oxides (mineral or other) with acetic acid or with very dilute H_2SO_4 or HNO_3 in a suitably arranged apparatus, the evolved oxygen may be measured. If carbonates are present, a preliminary treatment with acid is required. Heat need not be applied.

Manganese Determination.—Carnot says: Ignition of Mn oxides when absolutely pure yields Mn_3O_4, but the presence of even minute amounts of other substances alters the result. Evaporation of a Mn solution in

HNO_3 does not afford all of the Mn as MnO_2, unless it is repeated two or three times. The $KClO_3$ precipitation in strong HNO_3 requires repetition also in order to obtain pure MnO_2. The most ready method for obtaining a higher Mn oxide of constant composition, consists in adding H_2O_2 to the Mn solution, then ammonia in excess, and boiling. The precipitate is Mn_6O_{11}. By determining the "available oxygen" in this precipitate the Mn may be determined. Resolution, and re-precipitation of the Mn_6O_{11} is necessary if Cu, Zn, Ni or Co is present. Co requires five precipitations, the others but three. MnO_2 if precipitated by Br in ammonia solution, requires prolonged washing.—Compt. Rend., 1893, 1375.

Estimating Manganese.—Jean (Bull. Soc. Chim., ix., 248), mentions Pattinson's method with approval (see School of Mines Quarterly, xii., 336), also that of Volhard (vid. Blair, Anal. of Iron, etc., 2d ed., p. 112), which he attributes to Guyard, and describes essentially the Ford-Williams method as if it were new.

Manganese in Manganese Bronze.—Jones (Jour. Am. Chem. Soc., xv., 414). Dissolve 5 to 10 Gm. in HNO_3 (sp. gr. 1.2). Place in a cylinder, dilute to 300 C.c., and pass H_2S until the supernatant liquid is colorless. Decant through a dry filter 180 C.c. or some aliquot part, boil this down to 10 C.c., add 25 C.c. HNO_3, boil down, precipitate Mn by $KClO_3$, and conduct the rest of the operation as in the Ford-Williams process for Mn in manufactured irons.

Manganese, Review of Methods.—Saniter (Jour. Soc. Chem , Ind., xiii., 112). Geographically, the methods used are stated to be in general terms ; in England, Pattinson's method or Riley's modification of the same ; on the Continent, Volhard's method ; in the United States, the pyrophosphate (gravimetric). The gravimetric determination, as Mn_3O_4, is stated to be more or less in use in all countries. It was found practically impossible to obtain theoretical Mn_3O_4. An average of 20 lots of ignited precipitates contained 71.4 per cent. Mn against theoretical 72.05 per cent. Mn. (In the discussion, reference was made to the point noted by Messrs. Pattinson that the thickness of the crucible, the temperature of ignition, and many other points, apparently trivial, made a difference in the composition of the precipitate when weighed.) Ignition, when ammonia had been insufficiently washed about, also gave low results. Volatilization of some Mn under these conditions was asserted, but proof of this point was not very clear. The pyrophosphate method, as described by Blair (Analysis of Iron and Steel), was found to be the most accurate. The possible presence of Ca or Mg (derived from reagents or apparatus) may give high results. The remedy consists in separating as MnS, dissolving, and then precipitating as NH_4MnPO_4. Obtaining a perfectly crystalline precipitate, and washing with cold ammoniacal NH_4NO_3, are insisted upon as indispensable for accuracy.

Volhard's method is described as consisting in separating the iron, etc., by basic acetate, separating the Mn from the filtrate by Br, and dissolving this (ignited) precipitate in HCl, neutralizing with ZnO, and titrating with carefully standardized permanganate solution. The results were found to be a little low, "as there is always a doubt as to the precipitate being absolutely all MnO_2."

Pattinson's method—precipitation as MnO_2, and titration with $FeSO_4$, gave results lower than in the case of the Volhard, and requires that one's method of working should be standardized upon Mn oxide of known composition. It was noted that though different chemists differed from each other, each chemist agreed consistently with himself. In the discussion, Mr. Gray spoke of higher results being obtained by chemists in the United States than in England. This assertion was not accepted by another speaker.—School of Mines Quart., 1893, 276.

Manganese Permanganates.—Gorgen contests the assertion of Guyard that three permanganates may be obtained, viz., $Mn_2O_7.5MnO (= Mn_7O_{12})$, $Mn_2O_7.4MnO (= Mn_6O_{11})$, and $Mn_2O_7.3MnO (= Mn_5O_{10} = 5MnO_2)$. The experiments recorded indicate that those oxides are not permanganates.—Bull. Soc. Chem., 1893, 490.

MERCURY.

Purification of Mercury.—W. Jäger. The metal is submitted to a double distillation in vacuo, avoiding oiled cocks and caoutchouc joints, and purified by electrolysis in order to eliminate electro-positive metals.—Ann. d. Phys. u. Chem., 1893, 209; Zeitschr. f. anal. Chem., 1893, 602.

Volumetric Determination of Mercury.—A process for the volumetric estimation of mercury, based upon the reaction of a mercuric salt with protochloride of tin, is published by M. J. Laborde (Jour. Pharm. Chim., 1893, 507). For obtaining the protochloride solution, 8 Gm. of tin are dissolved in 100 C.c. hot hydrochloric acid and diluted to 2 litres. Ordinary precautions must be taken to preserve it as far as possible from the action of the atmospheric oxygen. This liquid is titrated with a solution of bichloride of mercury (10 Gm. to the litre) and to counteract the retarding action of the hydrochloric acid contained in the tin solution, 0.1 Gm. of the mercuric salt is treated with 5 C.c. of a liquid containing 100 Gm. ammonium acetate and 100 Gm. acetic acid per litre. The acetic acid disperses the brown color which appears when the protochloride of tin is in excess.

This dispersion takes place more slowly toward the end of the reaction, which is indicated by the entire liquid assuming a brown color upon the addition of 3 or 4 drops more of the tin solution. Upon determining by known methods the quantity of protochloride of tin which corresponds to a given weight of bichloride of mercury, it will easily be seen that the reaction takes place according to the theoretical formula:

$$SnCl_2 + 2HgCl_2 = SnCl_4 + Hg_2Cl_2.$$

This process is very convenient, rapid and precise, and can be used inversely, for estimating protochloride of tin in a solution, by the aid of a titrated solution of bichloride of mercury.

Calomel in Japan—The Manufacture of.—Edward Divers gives a most interesting and complete, as well as illustrated account of the manufacture of calomel in Japan. Calomel in the form common in England and all countries under Western civilization, is now extensively used and is even manufactured in Japan, under the name of kankō. But mercurous chloride is also largely used there under the name of "light powder," keifun (Chinese, kingfun), in another and very much older form, which is of signal purity, and made by a simple process as yet quite unknown in Europe. The author witnessed this interesting process from beginning to end some years ago, and now makes this publication of it with full permission of the proprietor of the works he visited, Mr. H. Kokubu, who has aided him in every way he could, and notably with drawings, some of which illustrate this paper.—For full details see Jour. Soc. Chem. Ind., 1894, 108; also, Amer. Jour. Pharm., 1894, 232.

Action of Mercurous Chloride on Silver Chloride in presence of Ammonia.—U. Antony and G. Turi. Pesci has shown that the black precipitate obtained by treating mercurous chloride with ammonia contains metallic mercury; this observation explains the well known fact that, on adding ammonia to the white precipitate obtained with hydrochloric acid in a mixed solution of silver and mercurous salts, silver is retained in the black precipitate. If the precipitate remains long in contact with ammonia, the reaction represented by the following equation may occur:

$$2Hg_2Cl_2 + 4AgCl + 8NH_3 = 2(NHg_2Cl.NH_4Cl) + 4Ag + 4NH_4Cl.$$

On repeatedly washing the mixture of silver chloride and mercurous chloride with ammonia solution on a filter, a residue was ultimately obtained which contained 1.16 per cent. of silver, instead of 30 per cent., as indicated by the above equation. When, however, the mixed chlorides precipitated from a solution containing excess of silver salt were digested with ammonia for some time, the resulting precipitate was found to contain the quantity of silver indicated by the equation. During a qualitative analysis, therefore, if silver is not found in the filtrate from this black precipitate, the latter should be examined for the metal.—Gazetta, 1893, 231; Jour. Chem. Soc. (Abs.), 1894, 94.

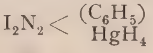
Ammoniacal Mercury Cyanide in Quantitative Analysis.—F. W. Schmidt (Ber. d. Chem. Ges., 1894, 225), finding that the methods so far used for converting into oxides metals which have been precipitated as sulphides, for the purpose of weighing them, are unsatisfactory, proposes the use of an ammoniacal solution of mercury cyanide as leaving no residue whatever on evaporation and incineration. On drying the metallic sulphide with the ammoniacal solution, the sulphide is readily converted into a cyanide, and mercury sulphide is formed. On incineration the latter is at once driven off, and the metallic cyanide converted into an oxide. The process has proved satisfactory with zinc, bismuth, iron and copper.

Mercuric Iodide—Oily Solution of.—Delacour describes the preparation of this solution (which is said to be eminently successful by injection against syphilis) as follows: 100 parts of the best olive oil are mixed with 30 parts of absolute alcohol. The mixture is allowed to stand for 4 to 5 days, and is frequently shaken vigorously. The alcohol is then separated from the oil; traces of alcohol temporarily retained by the oil are removed later, when the oil is sterilized. The oil is now heated in a casserole for 10 minutes up to 110–115° C. This temperature should not be exceeded, the oil losing its fine color, partially decomposing at higher temperatures. When the temperature has fallen to 65° C. the mercury biniodide is gradually added, stirring each time with a glass rod. When the temperature has fallen so far that the solution of the mercury salt is being retarded, the mixture may be gently heated over a Bunsen burner, holding the cup in the hand. The solution is then filtered through sterilized cotton into sterilized bottles. Care must be exercised not to allow the temperature to rise above 65° C. while adding the biniodide, which turns yellow at a higher temperature and dissolves no longer. The solution of one part of biniodide of mercury in 5020 parts of olive oil is very stable, especially when preserved in brown bottles. Journ. Pharm. Chim., 1893, 603.

Sublimation of Yellow and Red Iodides of Mercury.—Note by Berthelot. (Jour. Pharm. Chim., 1894, 70.) The author confirms Frankenheim's statement that when a mixture of red and yellow iodide is carefully heated on a glass plate and allowed to condense on another plate held at a short distance above it, the sublimate is a mixture of the red and yellow iodides. The result, however, cannot be regarded as proof of the existence of the red iodide in the state of vapor. There is little doubt that solid particles of the red iodide are mechanically projected from the lower plate to the upper, and bring about the immediate conversion of the yellow iodide that condenses in contact with them.

Crystallized Mercurous Iodide—Production by the Wet Method.—Francois (Jour. Pharm. Chim., 1894, 67) has obtained in the wet way small but very brilliant crystals of the mercurous salt, and since the iodide obtained by sublimation is mixed with free mercury, which can only be removed by washing with dilute nitric acid, a description of the method may be useful, since, as prepared by this method, all impurities are removed by washing with neutral solvents.

It is known that if an alcoholic solution of aniline be heated in contact with mercuric iodide, the latter is rapidly dissolved, and on cooling the liquid deposits crystals of iodide of diphenyl mercurammonium:



$$I_2N_2 < \begin{matrix}(C_6H_5)\\ HgH_4\end{matrix}$$

If ether be added to the mother liquor, brilliant yellow crystals, with a slightly greenish cast, are slowly formed; these crystals consist of mercurous iodide. The following proportions may be employed: 50 Gm. of mercuric iodide are dissolved with the aid of heat in a mixture of 100 Gm. of aniline and 200 Gm. of 90 per cent. alcohol; the solution is filtered and allowed to stand several days. The large crystals of the diphenyl mercurdiammonium iodide are drained off, and to the clear liquid 350 Gm. of ether are added. After about a week the yellow scales of mercurous iodide are collected in a filter, washed first with cold alcohol, and then with boiling alcohol and ether. A further addition of ether to the mother liquor produces a fresh crop of crystals, and this may be repeated several times. The yield is but small (2 Gm. at each addition of ether). The body consists of clearly defined yellow crystals which are insoluble in water, alcohol and ether, and are decomposed by warm potash solution with separation of mercury; they are blackened by ammonia. The formation of this body is evidently due to some reducing action, which is not that of ether or alcohol, and ultimately the author finds that it is due to the presence of aldehyde in the commercial ether employed, and that if the iodomercurammonium iodide, HgI,NH_3 be dissolved in a mixture of alcohol and ether, and aldehyde then added, the crystallized mercurous iodide is readily formed.

Solubility of Mercuric Iodide in Methylene Iodide.—Considering the indifference of red iodide of mercury to other liquids it is quite soluble in methylene iodide, being more soluble in the warm liquid, than when it is cold, the salt separating out on cooling in the yellow modification. At 100° C. one part of the salt dissolves in six of methylene iodide, and 58 parts of salt will dissolve in 100 of the liquid at 180° C., the boiling point of CH_2I_2 being 182° C.—Retgers in Zeitschr. f. anorg. Chem., 1893.

Testing Red Oxide of Mercury.—M. G. Patein finds that certain samples of commercial red oxide of mercury contain traces of metallic mercury and mercurous oxide, due to the employment of too much heat during the process of oxidation. These impurities may be detected thus: On porphyrizing, the color should not change, and on adding to 1 part of the oxide in a test-tube 20 parts of distilled water, and then gradually drop by drop hydrochloric acid until the oxide is dissolved, the solution should be perfectly clear and limpid; if the oxide has been partly decomposed the solution will not be complete, the insoluble residue consisting partly of metallic mercury in a finely divided state, and partly of mercurous chloride formed from the mercurous oxide present.—Jour. Pharm. Chim., 1893, 390.

Mercury Salicylates.—H. Lajoux and A. Grandval describe their later researches upon these compounds, which they were the first to prepare some years ago, when they obtained both normal and basic mercuric and mercurous salicylates. Normal mercuric salicylate they prepare by precipitating a solution of a mercuric salt with normal sodium salicylate, in the cold. It then occurs as a white powder, insoluble in water and decomposed by heat. When boiled with water it is entirely decomposed into salicylic acid and the basic salicylate. The latter compound is prepared directly from salicylic acid by suspending this in boiling water and adding recently precipitated and well washed oxide of mercury little by little, until the correct proportion has been used, care being taken that no fresh portion is added until the last is properly combined, that fact being indicated by the disappearance of the yellow tint of the mixture. The resulting white powder may be freed from any excess of acid by washing. It is insoluble in water, alcohol, ether, and chloroform, and is decomposed by heat.—Compt. rend., cxvii., 44.

Mercury Tannate.—As the mercury tannates of commerce vary considerably in composition, Fr. Gay recommends the following formula as at least forming a preparation of uniform quality: 76.2 Gm. of finely powdered tannic acid, 25.7 Gm. of finely triturated yellow mercuric oxide, and 50 C.c. of water are rubbed together in a mortar and set aside for two days. The hardened mass is powdered and still further dried over sulphuric acid. This preparation contains 23.8 per cent. of metallic mercury. It is an olive-green powder, and fully meets all chemical and therapeutic requirements.—Rép. de Pharm., 1894, 337.

Adulterated Vermilion.—E. J. Parry and P. A. Estcourt find barium sulphate and lead sulphate as well as starch in the commercial samples of vermilion examined by them.—Drug. Circ., 1894, 8; from Brit. and Col. Drug., 1893.

Preparation of Vermilion by Electricity.—In a wooden bath 1 meter in diameter and 2 meters high are placed circular shelves about 6 inches wide, on which is placed metallic mercury about one-half inch deep; these shelves are connected with the positive pole of the dynamo. At the bottom of the vat is a plate of steel-plated copper connected with the negative pole. The solution contains 8 per cent. of nitrate of ammonia and 8 per cent. of nitrate of soda. Through a perforated worm placed in the bath, sulphuretted hydrogen is introduced. Besides this the bath contains agitators. On passing the current, a precipitate of sulphide of mercury, that is, vermilion, is formed. Another method which is being tried, is to use a bath containing 100 liters of water, 4 kilograms each of nitrate of ammonia, nitrate of soda, sulphide of sodium and sulphur. In this case one has only to add sulphur and mercury instead of sulphuretted hydrogen.—Drug. Circ., 1893, 178.

South American Quicksilver.—Deposits in South America.—Chem. and Drug., 1893, 528.

Quicksilver Mining in Tuscany.—Account, in Chem. and Drug., 1894, 842.

METALS.

Separation of Metals.—Etz heats the dried sulphides in a current of air loaded with bromine vapor. $BiBr_3$ may be readily volatilized by applying a gentle heat, leaving $CdBr_2$ or $PbBr_2$ behind. $SnBr_4$ can also be separated in the same manner. The sulphides, if prepared by precipitation, must be quickly and thoroughly dried. Protracted exposure to air causes partial failure. With Wood's alloy and others, it is best to convert to sulphides by heating the chippings of the alloy mixed with pulverized sulphur in a porcelain boat surrounded by an atmosphere of CO_2 until the conversion to sulphide is effected, when most of the excess of S may be volatilized, and then passing Br vapors. The presence of a little excess of S does no harm.—Ber. d. Chem. Ges., 1893, 76 and 124.

Determining Metals as Oxides.—Schmidt says: It is often convenient and desirable, after separating some metals as sulphides, to convert them to oxides for weighing. Experiments made by igniting the sulphides with HgO, gave results always somewhat high, due to retention of some basic sulphate. Igniting with HgO and $Hg(NO_3)_2$ was better, but still showed a little too high. But when a solution of $Hg(CN)_2$ and ammonia was added, and the material heated finally to intense ignition, excellent results were obtained. Test analyses were made with Cu, Zn, Bi and Fe. Incidentally, the formation of the compound $Hg(CN)_2NH_3$ was observed.—Ber. d. Chem. Ges., 1893, 225.

Nitro Metals.—P. Sabatier and J. B. Lenderens describe a new series of compounds formed by the direct union of nitrogen peroxide with certain metals, the vapor being passed at a temperature of 25° to 30° C. over the metals in a finely divided state. Copper, cobalt, nickel and iron have been so far experimented with.—Bull. de la Soc. Chim., ix., 669.

Actions of Metals on Strong Acids.—G. J. Burch and J. W. Dodgson.—Chem. and Drug., 1894, 570.

NITROGEN.

Production of Nitrites.—H. N. Warren (Pharm. Jour. Trans., 1894, 798). Platinum was dissolved by the aid of aqua regia, evaporated to dryness, and the resulting platinic chloride thus formed maintained at a temperature of 400° F. as long as any chlorine continued to be evolved; the residue was now boiled with a slight excess of sodium carbonate, and the platinic hydrate thus produced dissolved by means of oxalic acid, the solution concentrated, and a sufficiency of asbestos yarn added to absorb the solution; the yarn, which now measured about a yard in length, when dried and ignited, contained about 12 per cent. of platinum, presenting a gray color characteristic of that metal when in the spongy form, the asbestos meanwhile retaining its original ropy properties without becoming brittle, as is the case when platinum chloride is used in place of the oxalate. The so prepared asbestos was next introduced into a combustion tube somewhat longer than the same, and connected to an apparatus evolving ammonia gas, a current of air being at the same time injected into the apparatus in order to furnish a mixture of oxygen and ammonia; the action of the platinized asbestos was now started by applying the flame of a Bunsen burner to the more remote end of the tube. Directly the mixed gases are allowed to impinge upon the platinized surface, dense clouds of ammonium nitrite are formed, and in several instances the whole length of the asbestos became intensely heated. The ammonium nitrite thus formed was conveyed into a solution of caustic soda, producing thus an equivalent quantity of sodium nitrite, the ammonia thus evolved being retained for a further supply. Some idea as to the delicacy of this so prepared asbestos can be obtained when for several minutes, while the apparatus was in complete working order, scarcely any excess of ammonia could be detected at the further end of the tube, the whole of it being converted into nitrite.

Nitrogen Iodide.—Senhay, of Buda-Pesth, has now succeeded in proving its composition to be HNI_2, by replacing the hydrogen atom by silver. This silver compound is readily obtained by adding oxide of silver or an ammoniacal solution of silver nitrate to iodide of nitrogen suspended in water. It is a black flocculent substance, which is quite as explosive as iodide of nitrogen itself. When carefully dried the least rise of temperature provokes explosion. It also detonates upon being struck, or even when brought into gentle friction with any other substance. When warmed under water, or when treated with dilute acids, it is quickly decomposed, silver iodide being deposited, free iodine liberated, and free nitrogen escaping with effervescence. The relative amounts of these products of decomposition conclusively proved the compound to possess the composition $AgNI_2$. The existence of the compound HNI_2 is thus fully demonstrated, and whether or not the compounds NI_3 and NH_2I are likewise capable of formation under different experimental conditions, is a question which doubtless further work will elucidate.—Chem. and Drug., 1894.

Indol as a Reagent for Nitrites.—Bujwid (Chem. News, 1894, 157), has obtained a very sensitive and beautiful reaction for traces of nitrites, in the examination of water with indol. An alcoholic solution of 0.1 to 0.2 part per 1,600 is diluted with water. The author takes 10 C.c. of water, heats it to 70°–80° C. along with a few drops of hydrochloric acid (free from nitrites), and adds a few drops of the solution of indol. There at once appears a fine red color, which becomes rather deeper for a few minutes. The reaction can be applied colorimetrically.

Determination of Nitrogen.—Official Methods of Analysis adopted by the Association of Official Agricultural Chemists (American) at its meeting at Chicago, August, 1893.—Reprinted in Chemical News, 1894, 187.

Determination of Nitrogen by Means of the Nitrometer.—E. Henry, in Bull. Soc. Chim., xi.–xiii., No. 1. Three figures accompany the article.

Nitrogen in Nitrates.—Schmitt (Chem. Zeit., xvii., 173). Dissolve 10 Gm. of the sample and dilute to 500 C.c. Place in a flask (round bottom) of about 750 C.c. capacity, 10 Gm. of an equal mixture of iron and zinc powder, add 10 C.c. glacial acetic acid and then run in slowly 25 C.c. of the solution of the sample (= 0.5 Gm.). After ten minutes, when no more gas is evolved, add 200 C.c. of water, and 30 C.c. NaOH solution (sp. gr. 1.25) and distil ammonia as usual.—See Archiv., 1893, 372.

Analysis of Commercial Nitrates.—Devada (Chem. Ztg., xvi., 1952), uses an alloy containing 45 per cent. Al, 50 per cent. Cu and 5 per cent. Zn, which, on solution in caustic alkali, in presence of a nitrate, affords NH_3. The Cu remains in a spongy form, which prevents bumping. The charge for the distilling-flask is 50 C.c. of water containing 0.5 Gm. of the nitrate examined, 200 C.c. H_2O, 40 C.c. KOH solution (sp. gr. 1.3), 5 C.c. alcohol, and 2.5 Gm. of pulverized alloy. A bulb filled with glass beads is mounted above the flask to prevent the mechanical carrying over of the alkaline solution, which is so liable to occur when H is evolved by alkali. Above the bead bulb is an empty bulb, and the neck above is connected with a condenser, the end of which dips below the surface of a solution of standard acid (20 C.c. half normal H_2SO_4). After charging, the mixture is heated gently for 20 or 30 minutes, and then distilled, when the distillate may be titrated back in the usual manner.

Stoklasa (Zeitschr. f. Angew. Chem., 193, 1861), reports on the examination of several different methods. He condemns utterly the "refraction" method and commends particularly Lunge's nitrometer method and that of Devada. He mentions in a foot-note the "silver" method of Wolfbauer, in which the nitrate is repeatedly evaporated with excess of HCl to convert all nitrate to chloride, which is finally dried, then dissolved and titrated with standard $AgNO_3$. On deducting the amount of $AgNO_3$ solution required in another portion of the original sample, a basis for calculation of the nitrate is obtained.

Determination of Nitrite.—Deventer (Ber. d. Chem. Ges., xxvi., 589, 932, 958), suggests the application of Schaffer's reaction (described in Ann. d' Chem., 1851), with ferro-cyanide and acetic acid: $2K_4FeCy_6 + 2HNO_2 + 2HC_2H_3O_2 = K_6Fe_2Cy_{12} + 2KC_2H_3O_2 + 2NO + 2H_2O$.

On measuring the NO, a basis for estimating the nitrite is obtained, giving results more satisfactory than by permanganate titration. The coloration due to formation of $K_6Fe_2Cy_{12}$ may be used as a qualitative test, and titration by $K_2Mn_2O_8$ affords a quantitative method for determining HNO_2 or dissolved oxygen by means of this reaction.

Determination of Nitrates.—Gruener (Am. Jour. Sci., xlvi., July, 1893). The nitrate, not to exceed in amount 0.05 Gm., KNO_3, is introduced into a retort, together with ten times its weight of KI and 17 to 20 C.c. of phosphoric acid (sp. gr. 1.43). All water used should be recently boiled. CO_2 is passed through. The neck of the retort passes into a receiver containing a known amount of tenth normal As_2O_3, alkaline with excess of $NaHCO_3$, and diluted. A safety trap is attached containing water. The solution in the retort is boiled until it is clear that no more iodine remains, when the receiver, after proper washing, and the addition of the water in the trap, is titrated with iodine to determine the amount of As_2O_3 left. The reaction with the nitrate is:

$$2HNO_3+6HI=4H_2O+2NO+3I_2$$

Experiments on the decomposition of nitrates with $SbCl_3$ were successful when special conditions were maintained.

Determination of Nitrates—The Iodometric.—H. Gruener has applied the process described by Gooch and Gruener, according to which nitrates were easily and successfully decomposed by a solution of manganous chloride in hydrochloric acid, the products of decomposition being passed into potassium iodide and the liberated iodine treated with sodium thiosulphate. The present paper deals with the application of hydriodic acid as a reducing agent of nitric acid.—Am. Jour. Sci., July, 1893; Chem. News, 1893, 40.

Physical Properties of Pure Nitrous Oxide.—P. Villard. The vapor density was obtained by means of a Natterer's tube. The results at the temperatures from 0° to 36.3° C. ranged from 0.0870 to 0.338. The critical temperature of pure nitrous oxide is 38.8° C., the critical pressure being 77.5 atm.—Compt. Rend., cxviii., No. 20.

OXYGEN.

Oxygen—Preparation of.—Delamotte (Rép. de Pharm., 1894, 54), recommends pharmacists to prepare oxygen for medicinal purposes by allowing water to fall intermittently and in small quantities on sodium peroxide, the reaction being checked when necessary by mixing the compound with an equal quantity of sand. This method is said to give a pure product in a brief time. Bardet prefers to add water to a mixture of 50 Gm. of barium dioxide with sixty of potassium permanganate. The gas thus rapidly given off in the cold contains a little ozone, but is said to be sufficiently pure to be respired.

Oxygen Manufacture.—G. Kassner describes a method of obtaining oxygen from the air by the agency of calcium plumbate, Ca_2PbO_4. This compound, in a spongy porous condition, is exposed to the action of well-washed furnace gases and rapidly absorbs the carbon dioxide present, calcium carbonate and lead peroxide being formed. These products are then heated to redness and oxygen is rapidly disengaged. When most of the oxygen has been liberated, carbon dioxide begins to come over, at first mixed with oxygen, but subsequently in a pure state. The mixed gases are passed over calcium plumbate, which absorbs the carbon dioxide, and allows only the pure oxygen to escape. When the carbon dioxide ceases to be evolved from the retort, a current of air is driven through and re-converts the residue into calcium plumbate, which may then be used for a subsequent operation.—Chem. Zeit., xvii., 1242.

Oxygen Manufacture.—Plumbate of calcium is said by Le Chatelier to be more advantageous than peroxide of barium as a source of oxygen. It is true that it requires a somewhat higher temperature than the latter to yield up the one atom of oxygen, but on the other hand it has the advantage of absorbing oxygen more rapidly, and without it being necessary to eliminate moisture and carbonic acid during the operation. Moreover, plumbate of calcium is a salt which is by no means difficult to prepare in a tolerably pure state, and is not costly.—Drug. Circ., 1894, 46.

——— A. Tonneau describes a simple process for obtaining oxygen gas readily, without the risks attending the usual methods. To the middle opening of a three-necked Woulffe's bottle, holding two to three liters, is fitted an ordinary separating funnel with stopper and stop-cock. This contains concentrated acetic acid, whilst in the bottle is placed a mixture of manganese dioxide and barium dioxide (about 100 to 200 Gm.) covered with water, upon the surface of which a layer of oil is floated to prevent frothing when the gas is given off. On allowing a few cubic centimeters of the acid to drop into the bottle, oxygen is at once given off in the cold, and, after passing through a wash-bottle, is ready for use. When the gas is required for medicinal purposes it may either be inhaled direct, as it leaves the wash-bottle, or be collected in a rubber gas-holder. If used in the former way, the action of the gas may be moderated by forcing air into the apparatus by means of a rubber ball fitted with a valve, as employed in spray diffusers, etc., attached to one of the necks of the Woulffe's bottle.—Ibid., 1893, 204.

Ozone—Studies on the Formation of.—W. A. Shenstone and M. Priest. —Pharm. Jour. Trans., 1893, 55.

Oxygen in the Earth's Atmosphere—Origin of.—T. L. Phipson believes that the original atmosphere of the earth consisted of nitrogen, and that the oxygen is a production of vegetable life.—Chem. News, 1893, 45. (See Ibid, 1894, 207.)

Ozone Formation at High Temperatures.—The usual method of making oxygen by heating potassium chlorate and manganese dioxide gives a gas having a strong chlorine-like odor, and the statement is frequently made that chlorine is present in the oxygen produced in this way; this odor, which could not be due to mere traces of chlorine, led Brunck to make an investigation. The residue, obtained by heating potassium chlorate and manganese dioxide, with water gave a clear and neutral solution (demonstrating that chlorine could not have been liberated, as in that case an alkali would either result or some manganese would enter solution as a manganate); the gas after washing with strong potassium hydrate solution not losing its property of bluing potassium-iodide-starch test paper first suggested the presence of ozone, which would explain the odor and behavior. It was then demonstrated that ozone was not decomposed at the temperature at which the gas is made, and that it could even exist at a red heat if it was not kept at that temperature too long. Perfectly pure potassium chlorate, if heated by itself, will yield a perfectly pure oxygen, but even traces of potassium chloride, silica, etc., are sufficient to cause the formation of ozone; equal quantities of black oxide of manganese and very carefully purified potassium chlorate gave off oxygen containing 0.3 per cent. ozone; the ozone increases with larger quantities of the black oxide; when the proportions are 25 to 1, the oxygen contains 1.55 per cent. ozone. A study of the metallic oxides in connection with this ozone formation showed that the oxides of silver and mercury and peroxides of lead and barium, even if heated in an atmosphere free from oxygen, will yield ozone; other oxides like those of manganese, cobalt and nickel heated in an atmosphere free from oygen will yield no ozone, but will do so if heated in a current of oxygen or if heated with some oxygen liberating substance like potassium chlorate. A remarkable effect is exerted by the alkalies; if small quantities of sodium carbonate, etc., be added to the manganese dioxide and potassium chlorate, no ozone is produced—the residue, however, then contains sodium peroxide; if the black oxide of this last experiment be thoroughly washed and used again with potassium chlorate, it will not have lost its property of forming ozone.—Apoth. Ztg., 1894, 41; from Ber. d. Chem. Ges., 1893, 1790.

Manufacture of Ozone.—The preparation of ozone on a commercial scale is reported to have been successfully accomplished. Andreoli, by adopting a special form of apparatus, in which many of the delicate bearings of Simens and Brodie's ozone generator are dispensed with, is said to have converted oxygen into ozone to the extent of six per cent. The oxygen or air is passed between points from which electricity under high tension "flows," and part of the oxygen is thus condensed into ozone. Shenstone and Priest, working with a generator of the Brodie pattern, are understood to have obtained as much as thirty per cent. of ozone. When formed, however, the gas is very difficult to preserve, on account of its tendency to become re-converted into ordinary oxygen, and also because of its extraordinary diffusive power. The experiments on its commercial production have been carried out at Messrs. Allen and Hanbury's Bethnal Green works, but full particulars have not yet been published.—Lancet, 3647, 210.

An Ozone Factory.—Description with illustrations, in Chem. and Drug., Aug., 1893, 211.

Ozone in the Light of the Periodic System.—A. Walkowicz, in Zeitschr. f. Anorg. Chem.; Chem. News; reprinted in Drug. Circ., April, 1894.

PHOSPHORUS.

Manufacture of Phosphorus.—By heating sodium or calcium metaphosphate with aluminum, phosphorus is obtained to the extent of 28–31 per cent. of the theoretical yield; the residue, which contains some aluminum phosphide, a gray crystalline powder of the formula Al_3P_5, by heating with silica liberates an additional quantity of phosphorus, so that by taking proper proportions of the metaphosphate, aluminum and silica, almost the full theoretical quantity of phosphorus is obtainable. Attempts to liberate phosphorus from the ignited superphosphate mixture (obtained from bone-ash and sulphuric acid) by heating it with aluminum and silica always resulted in explosions; these were always the result of heating a sulphate, like that of barium or calcium, with aluminum and silica; the chlorides of these metals are also decomposed by aluminum and silica, although not so violently as in the case of the sulphates.—A. Rossel and L. Frank, Ber. d. Chem. Ges. (Rep.), 1894, 38.

——— It is prepared by a process patented by Rossel, of Bern, by which glacial phosphoric acid or alkaline metaphosphates are heated with metallic zinc or aluminum; the metals dissolve in fused acid or its salts, and phosphorus distils over; this reaction takes place at a low red heat, whereas in the older process of reducing the metaphosphate with carbon a very intense heat was necessary.—Südd. Apoth. Ztg., 1893, 538; Am. Jour. Pharm., 1894, 34.

Red Phosphorus is not Amorphous, says Rettgers (Zeit. f. Anorg. Chem., 1893, 399), as he has ascertained by examining specimens microscopically. He therefore proposes to drop the term "amorphous," as applied to this modification of the element.

Yellow Phosphorus—Estimation of.—G. Tóth.—The phosphorus is dissolved in carbon bisulphide, and the solution is diluted with olive oil and agitated with solution of silver nitrate. The argentic phosphide thus obtained is oxidized by means of dilute nitric acid, and the aqueous layer is separated from the oil. The phosphoric acid is now estimated by the molybdate method and calculated to phosphorus. In four test experiments, 78, 93, 93 and 100 per cent. of phosphorus was respectively recovered.—Chem. Zeit., 1894, 191.

Iron and Alumina in Phosphates.—Mariani and Tasselli (Staz. Sper. Ag. Ital., xxiii., 31), criticise Glaser's method adversely, and propose the following method: Boil 1 to 5 Gm. of the material with 15 C.c. conc. HCl for ten minutes, dilute, oxidize with a few crystals of $KClO_3$ and a few drops of HNO_3, boil out Cl and filter, bringing the filtrate and washings up to 150 C.c. To the solution when cold, add 2 C.c. glacial acetic acid and 0.5 Gm. $(NH_4)_2HPO_4$, add ammonia little by little until a permanent precipitate forms, then 2 C.c. acetic acid. Shake well and let stand two hours. Filter and wash with 1 per cent. $(NH_4)_2HPO_4$ solution. Re-dissolve in a little HCl, and re-precipitate in the same manner as before. Ignite and weigh. Take half the weight of the ppt. as Fe_2O_3, and Al_2O_3.

Colorimetric Determination of Phosphorus.—Osmond (Bull. Soc. Chim., xlvii., 745) uses a solution containing 12 Gm. crys. $SnCl_2$ and 80 C.c. conc. HCl per litre. The phospho-molybdate precipitate after separation and washing on an asbestos filter, is dissolved by passing through the filter 100 C.c. of the $SnCl_2$ solution (to the Gm. of manufactured iron taken for analysis). The reddish-yellow coloration is compared, as regards intensity, with standard solutions containing known amounts of phospho-molybdate.

Iodosulphides of Phosphorus.—Three iodosulphides of phosphorus, prepared by M. Ouvrard, are described. The iodide of phosphorus, P_2I_4, is not attacked by sulphuretted hydrogen at the ordinary temperature, but at a temperature slightly higher than the melting-point of the iodide, about 115° C., hydriodic acid is slowly produced, and after a couple of days' heating at this temperature the reaction is usually complete. The product is readily soluble in carbon bisulphide, and the solution deposits crystals of an iodosulphide of the composition $P_3S_3I_2$. This substance forms very well-developed yellow crystals of high refractive power. They are permanent in dry air, but slowly attacked by moisture with elimination of sulphuretted hydrogen. They melt at 106° C. to a viscous liquid, and at 300° they inflame with evolution of iodine vapor and white fumes of phosphoric anhydride. Cold water only slowly attacks them, but they are rapidly decomposed by hot water. Fuming nitric acid at once induces an explosion accompanied by incandescence. The compound may more easily be prepared by dissolving the constituents in the correct proportions in carbon bisulphide, evaporating and heating to 120° C. in a current of inert gas, and again dissolving in carbon bisulphide; the solution deposits crystals of the new substance upon evaporation. It may also be at once obtained by dissolving iodine in a solution of sesquisulphide of phosphorus in carbon bisulphide and evaporating. The second iodosulphide of phosphorus has the composition PSI or $P_2S_2I_2$, and was obtained by the action of sulphuretted hydrogen upon the tri-iodide of phosphorus, PI_3. The solution of the product in carbon bisulphide deposits red crystals of the new compound PSI. These crystals are much more rapidly attacked by moist air than those of the first iodosulphide, and the reaction is accompanied by the liberation of fumes of hydriodic acid. They take fire upon warming in the air, disseminating the odor of sulphur dioxide and the violet vapor of iodine. Water dissolves them rapidly, producing trisulphide of phosphorus and hydriodic and phosphorous acids, and sulphuretted hydrogen is subsequently evolved owing to the decomposition of the trisulphide. The third iodosulphide was obtained by reacting with excess of diiodide of phosphorus upon the trisulphide. It is deposited from carbon bisulphide in deep red crystals, very rapidly decomposed by moist air, and its composition is P_2SI_4. Ouvrard has also obtained several new halogen derivatives of the sulphides of arsenic and antimony.—Chem. and Drug., 1894, 858; from Annales de Phys., June, 1893,

Origin of Phosphates.—Gauthier has examined the natural phosphates found in several localities, notably the Somme, the Ardennes, Mons, and the recently explored Grotte de Minerve in Herault. He finds that all these have derived their phosphorus from living matter, animal or vegetable. During the decomposition of animals and plants, the organic matter passes through two phases. First, bacteria act upon them, and give ammoniacal salts; secondly, micro-organisms act as oxidizing agents; sulphur passes into sulphate, nitrogen is transformed into nitrates, and phosphorus into phosphoric acid. Phosphorus found in the tissues of animals or vegetables is changed into ammoniacal phosphate, and this, being dissolved and washed down by water, will attack calcareous rocks and produces phosphates of lime and carbonate of ammonia, which resolve them into nitrate of lime. Gauthier holds that phosphates of lime are not derived from the bones of skeletons. He has succeded in producing all these changes by synthesis in his laboratory, while he has also been able to trace out the same phenomena in the Grotte de Minerve. In this grotto have been found large calcareous blocks, fallen from the vault, and which have been transformed *in situ*, by ammoniacal waters, into phosphates of lime. Some of the transformed blocks still contain nuclei of calcareous matter which have not yet been completely metamorphosed. Apart from the purely scientific interest of these experiments, they are not without a practical value to agriculture.—New Eng. Drug., 1893, 328.

Metallic Sulphophosphates.—A considerable number of metallic salts of sulphophosphoric acid, H_3PS_4, have been obtained in a pure state by Glatzel, of Breslau. They are prepared by heating an anhydrous mixture of the chloride or sulphide of the metal with phosphorus pentasulphide, being produced in accordance with the equations:

$$3RCL + P_2S_5 = R_3PS_4 + PSCl_3,$$
$$3R_2S + P_2S_5 = 2R_3PS_4.$$

—Zeitschr. f. Anorg. Chem., 1893; Amer. Drug. and Pharm. Rec., 1893, 158.

PLATINUM.

Platinum—Solution of.—W. L. Dudley finds that platinum black or platinum sponge when moistened with dilute hydrochloric acid on a filter and exposed to the air, is gradually dissolved, platinic chloride being formed. Experiments with iridium, rhodium, ruthenium and osmium yielded similar results.—Jour. Am. Chem. Soc., xv., 272.

New Platinum Base—Salts of a.—W. J. Sell and T. H. Easterfield describe the salts of a new platinum-sulphurea base, $Pt(CSN_2H_4)_4(OH)_2$, which has not yet been isolated in the pure state. The chloride is formed by adding platinic chloride solution to a boiling solution of sulphurea in hydrochloric acid. Then on adding strong HCl, in which the salt is very sparingly soluble, to the filtered solution crystalline needles of the chloride $Pt(CSN_2H_4)_4Cl_2$, are deposited. The sulphate, $Pt(CSN_2H_4)_4SO_4$, is deposited in regular octahedra when dilute sulphuric acid is added to an aqueous solution of the chloride. The picrate. $Pt(CSN_2H_4)_4Pk_2$, is very sparingly soluble in cold water, and crystallizes from hot water in golden yellow iridescent needles.—Chem. News, 1893, 223.

Platinum and Sulphuric Acid.—Taking as a unit (= 100) the loss of weight sustained by chemically pure platinum when subjected to the action of sulphuric acid, Heraeus has found the following ratios for various alloys: The loss on platinum with 5 per cent. of iridium was 73, with 10 per cent. of iridium, 58, and on pure gold, 10. Hence the writer now uses retorts of platinum coated with gold, which are said to be very serviceable. On platinum from an English retort the loss is represented by the figure 103. —West. Drug., 1894, 22.

New Zealand Platinum.—Discovery of ore yielding 46 oz. to ton.—Chem. and Drug., 1893, 514.

POTASSIUM.

Manufacture of Chlorates by Electrolysis.—H. Blumenberg (Amer. Drug. and Pharm. Rec.) prepares an aqueous solution containing a bromide or chloride corresponding to the chlorate or bromate desired. For this purpose, a vat is used. This vat is usually divided into two compartments by a porous partition, or instead a porous vessel may be placed therein—in either case the vat being divided into two compartments. An electric battery with the opposite wires leading to electrodes placed in the compartments of the vat is provided, the circuit being closed through the aqueous solution therein. The bases are set free in the electro-negative compartment, and the halogen in the electro-positive division. If the nascent hydrogen reduces in the electro-negative compartment, the electrode therein may be agitated to prevent such action. That is to say, any excess of hydrogen will have a tendency to polarize the negative electrode, which tendency is obviated by agitating that electrode. Otherwise that part of the electric current employed in electrolyzing would then be trying to overcome this state of polarization, and would show itself in an undue rise of the 120° temperature in the bath. Then again hydrogen must be gotten rid of to a certain extent to prevent its combining with the chlorine, and thereby forming hydrochloric acid, which would react upon the hydrate of potassium till they would be mutually neutralized, forming again the chloride of potassium.

Manganese Dioxide and Potassium Chlorate.—H. McLeod (Jour. Chem. Soc., 1894, 202). Explanation of interaction given was that the decomposition of the two substances on heating takes place in three stages. First, we have

$$2MnO_2+2KClO_3=K_2Mn_2O_8+Cl_2+O_2.$$

Then the permanganate of potash itself undergoes change—viz.,

$$K_2Mn_2O_8=K_2MnO_4+MnO_2+O_2.$$

Finally, the manganate reacts with the chlorine thus:

$$K_2MnO_4+Cl_2=2KCl+MnO_2+O_2.$$

Preparation of Potassium Iodate.—Gröger (Zeitschr. f. Angew. Chem., 1894, 13). Dissolve 40 Gm. pure $K_2Mn_2O_8$ in a litre of hot water, add 20 Gm. KI dissolved in a little water, heat over a boiling water-bath for 20 to 30 minutes, and then add alcohol drop by drop, until the liquid is decolorized. Filter, and wash the precipitate with hot water. Then acidify with acetic acid, evaporate to 50 C.c., cool and allow to crystallize, and then wash the crystals repeatedly with strong alcohol and dry. The yield is 90 to 95 per cent. of the theoretical amount indicated by $KI+K_2Mn_2O_8+H_2O=KIO_3+2KOH+2MnO_2$.

If acetic acid is not used, much loss may be experienced in attempting to wash adhering alkali from the crystals.

Rochelle Salt—Solvent Action of.—Recent investigation has shown that the solvent action of rochelle salt, as shown on the hydrates of iron and copper, also exerts itself on the hydrates of zinc, manganese, nickel, cobalt, chromium and aluminum.—Chem. News, 69, 125.

Falsification of Potassium Permanganate.—A. Schlumberger (Rev. de Chim. Anal.; Rép. de Pharm., 1894, 260). Dextrin is colored with malachite green or analogous coloring matter, then dried upon plates of glass in a similar manner to "scale" preparations. The product is described as shining black spangles having a greenish tinge. It is totally different in appearance from the violet crystals of the permanganate when separately examined and compared, but likely to escape notice when mixed with the genuine compound in small crystals. Schlumberger has been able to dye skeins of silk of a green color by soaking them in a solution prepared from the pseudopermanganate.

Preparation of Potassium Cyanide.—Powdered potassium ferrocyanide and potassium dichromate are dried in iron crucibles at a gentle heat. They are then mixed in the proportion of four parts of the former to three parts of the latter, and the mixture gradually introduced, in small quantities at a time, into a large iron crucible heated to a point just short of a red heat. Oxidation takes place, and is indicated by a glowing of the mass. As soon as one portion has ceased to glow, the next is introduced, and so on, the contents of the crucible being stirred occasionally with an iron spatula. The temperature is regulated so that the mass does not melt, but remains spongy and porous. After cooling, the product is powdered and extracted with five times its volume of hot 80 per cent. alcohol. The solution is filtered, and on cooling deposits potassium cyanide as a perfectly white crystalline powder. The mother liquor is used to extract the powder a second time, and the process repeated until no more crystals are obtained. The potassium cyanide is then washed several times with small quantities of ether.—H. Erdmann, Ber. d. Chem. Ges., 1893, 2438.

Cream of Tartar Trees.—Brit. and Col. Drug., 1894, 607.

Manufacture of Cream of Tartar.—Manufacture in California and other countries.—Chem. and Drug., 1893, 122.

Potassium Determination.—Villiers and Borg (Bull. Soc. Chem. [3] ix., 602). After obtaining K_2PtCl_6, well washed with a mixture of alcohol and ether, dissolve through the filter with boiling water, acidify with HCl, insert strips of metallic Mg, boil until all Pt is reduced, and Mg dissolved, and filter and weigh Pt. Precipitation of K_2PtCl_6, in presence of sulphate always gives low results. If bromides are present, the precipitate contains some Br. in place of Cl. Errors due to this fact are avoided by weighing the metallic Pt of the precipitate.

Estimation of Potassium by the Lindo-Gladding Process.—T. Breyer and H. Schweitzer, in reply to Holleman, state that this process has also been investigated by Herff. The results communicated to the American Association of Official Agricultural Chemists, fully confirm those previously obtained by the authors: not only do they not agree among themselves, but they are, as a rule, from 0.5 to 1 per cent. higher than those obtained by the Stassfurt method. The authors once more recommend that the Lindo-Gladding process should be abandoned.—Chem. Zeit., 1893, 101, 102.

RUBIDIUM.

Rubidium Iodide.—It has been claimed that rubidium salts have the same thereapeutic effect as those of potassium, without possessing the disturbing influence of the latter, but a bar to their general employment has been the difficulty of producing them in a sufficiently pure condition. It is stated that this difficulty has now been removed by the new process of E. Erdmann for the recovery of rubidium salts from the Strassfurt potash deposits, and that the preparation of rubidium iodide on a large scale has been undertaken. This compound forms white, non-efflorescent crystals, which are odorless and of milder taste than the corresponding potassium salt. It is also more readily dissolved by water than the latter, and has been administered internally in 2½ per cent. solution, externally in drops containing 5 per cent., and in ointment of the same strength with soft paraffin as a basis. If the statements made by various professors and practicing physicians, regarding the action of the salt, should be confirmed, further proof will be afforded of the connection supposed to exist between physiological action and physical and chemical characters. If potassium salts owe their more prompt action, as compared with sodium salts, to their higher molecular weight and greater electrolytic conductivity, rubidium salts may naturally be expected to take a higher position on similar grounds. Whilst the molecular weights of the three elements are : Sodium, 23 ; potassium, 39 ; rubidium, 85.4, the electrical conductivity of their iodides shows a similar ascending progression, thus :

Dilution.	Sodium Iodide.	Potassium Iodide.	Rubidium Iodide.
d = 32	105.7	128.5	130.6
d = 1024	119.1	140.7	144.3

And these data are said not only to "represent the actual and relative rapidity with which the different iodides are distributed throughout the organism, under the influence of osmotic pressure and electrical currents, but they also afford a direct measure of their degree of medicinal activity, for physiological activity is occasioned by ability to enter into chemical reactions, and, according to the new general law discovered by Ostwald, chemical activity is proportional to electrolytic conductivity."—Therapist, iii., 89.

SELENIUM.

Selenium as a Succedaneum of Sulphur.—Selenium and sulphur are elements of the same group, and have many parallelisms. This fact very recently led Dumontpallier and Féry to experiment with selenium as a remedy in skin diseases, and they now report, in the Union Pharmaceutique, that for external use it possesses many advantages over sulphur. Its value as an internal remedy is not yet established, and its known toxicity makes such experimentation a matter of more extended research. It was used as a salve in the treatment of psoriasis, prurigo, pruritis, eczema, etc., the formula being 2 parts of precipitated selenium to 30 parts of vaselin.—Chem. Zeit. (Rep.), 1893, 222.

SILVER.

Silver Cyanide—Gelatinous.—L. K. Frankel describes a transparent gelatinous mass by fusion of silver chloride and potassium cyanide. It contained 5 per cent. less silver than theory required for silver cyanide.—Chem. News, 1893, 178. (See Stas, Compt. rend., lxxiii., 998.)

Ethylenediamine Silver Phosphate.—J. Schaeffer employs this salt as a germicide, and considers it superior to corrosive sublimate.—Zeitschr. f.

Hygiene u. Infectionskr., xxi., 1894; Amer. Drug. and Pharm. Rec., 1893, 187.

Silver Chloride.—If silver chloride be raised to a temperature of 220° C., it is so modified as to become unsusceptible to the action of light. Acworth conjectures that the complete removal of moisture is the cause.

Abney has exposed to the light perfectly dry silver chloride in a vacuum in a glass tube; the chloride was not affected; but when melted silver chloride was poured into petroleum and exposed to the light, it was instantaneously darkened. Three facts have been established:

Silver chloride, dry and completely isolated, is not sensitive to light (Abney's experiment). Access of atmospheric air does not restore sensibility when the silver chloride has been completely dehydrated at 220° C. (Acworth's experiment). The presence of oxygen is neither necessary nor material in the darkening of silver chloride. Silver chloride clings tenaciously to the last traces of water. So long as moisture is present, the molecule of silver chloride readily disintegrates, by the action of light or any other form of energy. The rôle played by moisture in the chlorine reaction is somewhat striking. Absolutely dry chlorine has no action on copper filings; but on adding the merest trace of moisture, the liveliest reaction ensues.—Zeitschr. f. Anorg. Chemie; Bull. Pharm., 1894, 278.

Reduction of Silver Nitrate by the Action of Light.—M. Roux was led to investigate this subject by the explosion of an old argentic solution, for which there seemed no cause. He introduced into a tube a concentrated, perfectly neutral silver solution, and exposed it to the light in the presence of distilled water. After several weeks, the silver nitrate was reduced to metallic silver, a gas, giving all the reactions of oxygen, was disengaged, and the solution which had been neutral presented a slightly acid reaction —probably by the following equations:

$$2(AgNO_3) = 2Ag + N_2O_5 + O$$
$$N_2O_5 + H_2O = 2NO_3H.$$

In the opinion of the author, the explosion of the solution mentioned, which was one of the many solutions for the marking of linen, based on silver nitrate, is explained by the presence of sodium carbonate and ammonia, in sufficient quantity to redissolve the precipitate of argentic carbonate, formed from the mixture of the two solutions, the solution becoming acid, and decomposing the sodium carbonate into sodium nitrate, water and carbonic anhydride. In the opinion of the author, the addition of ammonia in excess, beside the use of yellow glass containers, for such solutions, is necessary for preventing such explosions.—Jour. Pharm. Chim., 1893, 510.

Solution of Silver Nitrate.—A solution has been found by Van der Spil (Geneesh. tydsch. von Ned. Ind., through Rev. Int. de Bib. Med., 1893, 213), to become gradually less clear, if the glass of the container is of poor quality; that is, if it contains considerable alkali.

Copper Sulphate Solution will undergo a change from the same cause.—Amer. Jour. Pharm., 1893, 387.

Silver Solubility in Ammonia.—Contrary to accepted notions, Cary Lea has shown that silver is gradually dissolved in dilute ammonia, if it has been obtained by precipitating the metal from its nitrate solution by means of sodium hydrate or cadmium, and then carefully purified. The presence of atmospheric oxygen to preliminary oxidation of the silver is necessary, however.—West. Drug., 1894, 19.

Volumetric Determination of Silver.—G. Deniges describes a method that may be employed for all compounds of silver in any state whatsoever. The author employs silver nitrate and potassium cyanide in an ammoniacal solution with potassium iodide as an indicator.—Chem. News, 1894, 42; from Compt. rend., cxvii., 1078.

SODIUM.

Action of Sodium upon Water.—The cause of the violent explosion taking place when water is decomposed by sodium has not been clearly ascertained. As the result of some inquiry into this subject, M. Rosenfeld has come to the conclusion that a compound of sodium and hydrogen is formed, the sudden dissociation of which is the cause of the explosion.—Journ. f. prakt. Chem., xlviii., 599.

Soda Production in Siberia.—According to S. S. Von Zaleski, the Barabiscian and Kulusidian steppes are well supplied with plants adapted for the production of soda, the more important of which are members of the genuses Atriplex, Salicornia, Nitraria, Statice Gmelini, Salsola and Chenopodium. The cut and dried plants themselves furnish the necessary fuel. These plants can also be cultivated with profit for the production of soda on the vast salt steppes which are at present inhabited only by nomadic tribes.—Amer. Drug. and Pharm. Rec., 1894, 32.

Caustic Soda.—The composition of the 60° and 70° article is about as follows:

	60°	70°
	Per cent.	Per cent.
Caustic soda	72	85
Carbonate of soda	2	4
Chloride of soda	19	6
Sulphate of soda	5	5

—Chem. and Drug., 1893, 345.

Caustic Soda and Bleach by Electrolysis.—Description of process of Mr. Greenwood, in Montreal Pharm. Jour., 1894, 13.

Sources and Applications of Borax.—E. L. Fleming, in Brit. and Col. Drug., 1894, 512; from Chem. Trade Jour.

Manufacture of Borax.—Improvements are given in Pharm. Era, Aug. 1, 1893.

To Increase the Solubility of Borax.—The addition of a small amount of sugar greatly increases the solubility of borax. It will also rapidly liquefy a solution of gum arabic which has become gelatinous from the presence of borax.—Nat. Drug., 1893, 139.

Sodium Borate (Tetra-), Neutral.—Jaenicke (Monatschr. f. Ohrenheilk., etc., 1893, 313), in the report of his experience with this remedy, makes the following remarks regarding the origin and behavior of this body: If small quantities of boric acid be successively added to a solution of borax (of alkaline reaction), the interesting fact will be observed that the boric acid dissolves in that fluid much more copiously than in the same quantity of water. On continuing the addition of boric acid until the reaction of the solution to litmus paper has become neutral, it will be found that it contains about equal parts of boric acid and borax. This process is more rapid at boiling temperature, 100 Gm. of water sufficing to dissolve 100 Gm. of borax and 100 Gm. of boric acid. On cooling, the solution slowly deposits small, short, rosette-shaped, crystalline conglomerations, resembling neither the beautiful column-shaped crystals of borax nor the flat and thin laminæ of boric acid. They are clear as glass and very hard; in water at room-temperature, they dissolve very slowly up to 18 per cent.; at blood heat, to nearly 40 per cent.; and in boiling water, quickly to the extent of 70 per cent. The solutions are neutral in reaction. The most remarkable physical property of sodium tetra-borate is its capacity of remaining for some time in solution to excess. The author states that the behavior of this body toward absolute alcohol proves that it is not a simple mixture of boric acid and borax, and concludes that it must be a definite chemical combination originating from these two substances. The therapeutic advantages claimed for this compound are almost absolute absence of irritation and virulence, permitting of the use of concentrated solutions, and, in any case, reliable antiseptic efficacy and free solubility.

Electrolysis of Fused Sodium Chloride.—C. Vantin, in Brit. and Col. Drug., 1894, 499.

Sodium Fluoride—Physiological Action of.—A. G. Bloxam, in Chem. Zeit., 1893, 1244.

Sodium Fluoride, when used as a preservative of foods, is apparently not the harmless agent that it is claimed to be; some fish kept in a 2½ per cent. solution of sodium fluoride at 15–35° C., showed signs of decomposition at the end of two weeks; a 5 per cent. solution kept the fish in good appearance for six months. To test the question as to the physiological effect of such preserved food, a portion of baked fish was eaten; the flow of saliva was notably increased at once, followed a little later by vomiting and purging, these symptoms of poisoning disappearing during 48 hours. The quantity of sodium fluoride taken in this case was estimated at 5.5 Gm.; one Gm. taken by a grown person during a meal was followed by salivation, headache and nausea. These signs of impaired digestion continued for over 48 hours.

Sodium Phosphate as a Purgative.—Constantine Paul has devised the following formula: Distilled water, 200 Gm.; sodium phosphate, 25 Gm.; simple syrup, 60 Gm.; and tincture of lemon, 20 drops. In order to gasify the preparation, 9 Gm. each of citric acid and sodium bicarbonate may be added.—Jour. Pharm. Chim., 1893, 527.

Sodium Borosalicylate.—P. Adam prepares this compound by heating together boric acid and sodium salicylate in the presence of water. A syrupy liquid is produced which yields, on evaporation, a transparent horny substance. This when carefully desiccated becomes a white opaque mass. It dissolves in four times its weight of cold water, and in its own weight of water at 40° C. It is also soluble in methylic, ethylic and amylic alcohols, acetic ether and glycerin, slightly soluble in acetone, but insoluble in ether. Solutions made by the aid of heat remain supersaturated.—(Bull. de la Soc. Chim. [3], xi., 204.)

Behavior of Sodium Peroxide Towards Acids.—Z. Tafel. By the action of alcoholic hydrochloric acid at about 0° C. a white powder is formed, which, after purification, undergoes decomposition at 100° C., oxygen being evolved. This substance is a mixture or a compound of 2 mols., NaCl and 1 mol. NaO.OH. It decomposes gradually at the ordinary temperature, dissolves in ice-cold water without evolution of gas, and the solution has a strongly alkaline reaction. Sodium peroxide dissolves in alcoholic acetic acid, and a compound is deposited which resembles the preceding substance in appearance and general properties, but its aqueous solution is neutral.—Ber. d. Chem. Ges., 1894, 816.

Sodium Peroxide in Analysis.—J. Clark renders sulphur and arsenic soluble in minerals by cautiously heating the powdered substance with sodium peroxide. Chromium in its ores and alloys may also be estimated in this manner. An ammoniacal solution of sodium peroxide may be used for separating manganese from nickel cobalt and zinc.—Jour. Chem. Soc., 1893, 1079.

Strontium Salts—Pharmacy of the.—F. W. Haussmann contributes a comprehensive article on the important strontium salts employed in medicine, in Merck's Mark. Rep., 1893, 296. The writer has experimented to ascertain whether, from the home supply of the more common strontium salts—such as the chloride, nitrate and carbonate—preparations could be made of sufficient purity to warrant their being substituted for the expensive French articles. With this object in view, a number of commercial salts were examined as to their purity, the most important being the nitrate and the carbonate.

Strontium Nitrate.—The impurities which may be looked for in this salt are barium, calcium and potassium nitrate (saltpetre)—the latter being added as an adulterant when used in pyrotechnics. The most important one to the pharmacist and physician is barium, to separate which considerable care must be taken. There seems to be a difference of opinion among medical authorities regarding the toxic action of barium salts. Bardet, in a paper read before the Therapeutic Society at Paris, in December, 1891, considers them to be not so poisonous as claimed by some; while others hold that they are active poisons, producing blood-coagulation and embolism, as well as gastric irritation. However, the small amount generally present in commercial strontium salts, will probably not produce decided toxic effects, but may cause gastric irritation.

Testing for Barium.—The test chiefly employed for the detection of barium, is based on the formation of an insoluble chromate, while the corresponding strontium salt, though precipitated from neutral and alkaline solutions, is soluble in the presence of acetic acid, or an acetate. Patein (Revue Therap., 1892, page 13) tests for the absence of barium in the following manner: (1) To 5–10 C.c. of a saturated solution of the strontium salt, acidulated with acetic acid, add 2 or 3 drops of test-solution of potassium dichromate. The solution should remain clear at least 24 hours; the presence of 1 per cent. of barium salt is said to cause precipitation. Hydrochloric and nitric acids dissolve barium chromate and are, therefore, not admissible. (2) To a very dilute solution of the strontium salt, previously acidulated with acetic acid, add 2 or 3 drops of a solution of neutral potassium chromate. The mixture should remain clear several minutes. To purify the salts, the addition of a few drops of diluted sulphuric acid is recommended.

More preferable is the method suggested by Jungfleisch, who employs Luedeking's test, which consists in adding a few drops of a saturated solution of potassium chromate to the strontium solution (previously acidulated with acetic acid), and heating; in the presence of barium, a precipitate will form in a few minutes. If, in the place of the neutral chromate, a solution of the dichromate be used, the addition of an acetate should be made—preferably, sodium acetate; the mixture is also to be heated. The writer has found this process the most satisfactory. In the place of potassium chromates, those of sodium may be used with advantage.

Another reagent which precipitates barium is hydrofluorsilicic acid, while it has no action on either calcium or strontium. The chromate action is, however, much more satisfactory.

Testing for Calcium.—All the strontium is precipitated by means of diluted sulphuric acid, taking care not to use an excess of the latter, as the sulphate is slightly soluble in it. The aqueous portion, filtered from the precipitate, is neutralized with ammonia, and subsequently treated with a solution of ammonium oxalate; a white precipitate indicates the presence of calcium.

Owing to the above mentioned solubility of strontium sulphate, an erroneous conclusion may at times be derived on obtaining a precipitate. However, the true nature of the precipitate may be proved by holding a fragment in the flame of a Bunsen burner, when, if strontium is present, the characteristic crimson flame appears. It is, perhaps, best to evaporate the filtrate to a small bulk, before applying the oxalate of ammonium reagent; in this manner, advantage is taken of the greater solubility of calcium sulphate in water. Nitrate of calcium is soluble in alcohol, while the corresponding strontium salt is not; which fact could be used with advantage to separate the two salts when found mixed with each other. For analytical work, however, it is not reliable, as the strontium salt is also slightly soluble in that solvent. The presence of strontium is revealed with certainty by the flame test.

Testing for Potassium.—An aqueous solution of the suspected salt is carefully precipitated by ammonium carbonate, the insoluble portion removed by filtration, and the filtrate, previously neutralized with acetic acid, evaporated to a small bulk, and again filtered. To the remaining filtrate, a saturated solution of sodium bitartrate is added. A crystalline precipitate of cream of tartar would indicate the presence of potassium. As strontium carbonate is also slightly soluble in water, evaporation is necessary to obtain a correct result. It is, perhaps, better to add the acetic acid after evaporation and filtering.

Another method to detect potassium salts and similar soluble impurities, is based on the amount of strontium sulphate obtained from the nitrate. 1 Gm. of nitrate should, after precipitation with diluted sulphuric acid, yield between 0.80 and 0.85 Gm. of dry sulphate.

Other impurities—such as heavy metals—are not usually found in commercial strontium nitrate. The author examined ten commercial samples, and with the exception of two, every salt contained barium; calcium was found in all but three samples, while potassium was present in two; one sample contained also sodium chloride.

Another source of strontium salts is the carbonate. Four samples were examined; none of which contained barium, but with one exception calcium was found in all. The author describes the preparation of strontium salts from the minerals (See Proc., 1893, 798).

Strontium Hypophosphite.—Strontium hypophosphite is not found in commerce, but the salt may easily be prepared in solution by saturating hypophosphorous acid with strontium carbonate. Owing to the generally conceded easy tolerance of the strontium salts by the stomach, the hypophosphite may perhaps be of some value in the treatment of phthisis—administered alone or in combination with other hypophosphites. The dose is conjectural; but, considering general statements, it should be about the same as that of calcium hypophosphite. It may be given in solution, or, preferably, in the form of syrup. The following procedure furnishes a preparation which contains 2 grains of the salt in 1 fluid dram. —195 grains of commercial 50 per cent., or about $6\frac{1}{2}$ drams of 10 per cent. hypophosphorous acid, previously diluted with water, are saturated with pure strontium carbonate, using moderate heat, and filtered. Water is then passed through the filter to make the liquid measure 4 fluid ounces. The addition of glycerin tends to preserve the solution. A still better preparation is the syrup, prepared in a similar manner. The aqueous filtrate, calculating from the quantities given above, is made to measure $2\frac{1}{2}$ fl. oz., and in it are dissolved 3 oz. of granulated sugar—subsequently adding enough water to measure 4 fl. oz.

Strontium Phosphate.—An attempt was made to prepare a lacto-phosphate syrup, on the type of the official syrup of calcium lactophosphate; but the result was negative. The dry salt was mixed with diluted and with concentrated lactic acid, both cold and under the influence of heat, but yielded very little to that solvent. Still, when the latter was treated with sulphuric acid, strontium sulphate was precipitated. The experiment was repeated, with the substitution of the freshly precipitated phosphate, in place of the dry salt; but, while the solubility of the former appeared to be greater, the result was about the same. Finally, 40 grains of the dry salt were allowed to remain in contact with 60 grains of lactic acid and some water, for about three months, at the end of which time only about 6 grains were found to be dissolved.

The foregoing experiments tend to show that strontium phosphate is considerably less soluble in lactic acid than the corresponding calcium salt. It is said to be used as an antiseptic, antiparasitic, and restorative.

Strontium Benzoate.—This salt is best prepared by saturation. For this purpose 45 grains of benzoic acid were dissolved in 12 fluid drams of boiling water, and neutralized with strontium carbonate, of which, theoretically, about 26 grains are required. (The yield should be 60 grains of the salt.) The solution was filtered, and allowed to stand over night. On examination the following morning, a few clusters of stellately arranged crystals were found deposited. The remaining liquid, on evaporation, furnished more of the salt, but care must be taken to regulate the heat, to prevent charring. Thus prepared, strontium benzoate is white, crystalline, of sweetish taste and acid reaction. It is soluble in 20 parts of cold, more readily in hot water; insoluble in alcohol. Treated with hydrochloric acid, its aqueous solution deposits benzoic acid; and if this is removed by filtration and the remaining liquid treated with dilute sulphuric acid, precipitation of strontium sulphate takes place.

Strontium Salicylate.—Strontium salicylate is not found in commerce. In the Medical News it is stated that, theoretically, this salt would be of clinical value. If the severe action of sodium salicylate on the stomach, and the statement made regarding strontium salts in general be taken into consideration, it might be well worthy of a trial. Two methods of preparation were followed by the author, precipitation and saturation.

(1) If concentrated solutions of strontium nitrate and sodium salicylate are mixed, precipitation shortly takes place, forming in crystalline clusters. The following proportions were used: 70 grains of strontium nitrate, previously washed with alcohol and dried, were dissolved in 4 fluid drams of hot water and filtered. This was mixed with a filtered solution of 112 grains of sodium salicylate in 3 fluid drams of hot water. The crystals formed were drained and washed with a small amount of alcohol. They are colorless, of a sweet taste, and neutral reaction; soluble in about 20 parts of cold water, more so in hot water, soluble also in alcohol. Tested for both basic and acid radicals, an aqueous solution responded to the respective reagents.

(2) The saturation method proved more satisfactory: 138 grains of salicylic acid were dissolved in 2½ ounces of hot water, and saturated with strontium carbonate (of which about 75 grains are required); the heat being continued until the acid was completely neutralized. The solution was filtrated while hot; on cooling, crystallization rapidly took place. The crystals were removed, and the solution was evaporated, which yielded more of the salt. This occurs in pinkish crystals, of a sweet taste and neutral reaction. The solubility and general behavior were identical with those of the precipitated salt. Probably the natural color of the salt, when prepared in this manner, is white; and it is likely that in its preparation, owing to the influence of heat, phenol was liberated, producing the pink color. The dose is about one-half of that of sodium salicylate.

Manufacture of Medicinal Salts of Strontium.—H. B. Dunham precipitates the barium by means of sulphuric acid instead of calcium sulphate, as the latter cannot be removed save by alcohol from the strontium. The author takes about a pound of the nitrate of strontium, places it in a 6-inch capsule, and heats for 20 minutes in the coals of a hot fire. It is reduced to oxide. Water is added; the supernatant liquid containing barium hydrate is poured off. After again decanting a like amount of liquid, and finding the residue free from barium, it is dissolved in boiling water and the strontium hydrate, now pure, crystallizes rapidly out.—New Eng. Drug., 1893, 17.

Strontium Iodide.—Malbec has given his reasons for regarding this drug as a good substitute for the iodide of potassium in cases where the latter begets intolerance. The strontium salt occurs in hexagonal tables, very soluble in water, and has a salty taste; it readily decomposes into iodine and strontium oxide, presenting various colors. The purity and stability of the drug must be secured for bedside use, since the iodate of strontium is toxic. Like the iodide of potassium, the new drug has its influence over diseased states of the myocardium and larger arteries. In the few cases where a prolonged use of the new drug has been experimented with, it has been found not to give rise to intolerance. It has the same dosage as the potassium salt.—Notes on New Rem., 1894, 25.

SULPHUR.

Variations of Viscosity in Melted Sulphur.—J. Brunhes and J. Dussy. The speed of flow of melted sulphur increases from the point of fusion to a temperature between 156° and 157° C. Above that limit it decreases rapidly and becomes so viscid that at 162° it no longer flows in the tubes of 1 Mm. in diameter under a pressure measured by a column of mercury of 700 Mm. The flow of sulphur at 156° C. is equal to $\frac{1796}{1000}$ of that which it has at 115.5°.—Compt. Rend., cxviii., No. 19.

Test of Free Sulphur.—J. C. Gil. On adding an alkali polysulphide, or a solution of sulphur in an alkali hydroxide, to hot alcohol, which has been boiled long enough to expel all air, a little color is gradually developed. On cooling, the blue color disappears; it is, however, restored by reheating, if oxygen, or any other substance which decomposes polysulphides, has been expelled, otherwise not. 0.4 Mgm. of hepar sulphuris will color 50 C.c. of 96 per cent. alcohol. To use the test for the detection of free sulphur, the substance is added to boiling alcohol containing a trace of potash—Zeitsch. f. Anal. Chem., 1894, 54.

Estimation of Sulphur in Organic Liquids.—R. Höland. The accurate estimation of small quantities of sulphur in substances such as tar oils, etc., is still a matter of some difficulty. The author has, however, obtained satisfactory results by burning the sample in a combustion tube with a mixture of 5 parts of barium carbonate and 1 part of potassium chlorate. The details are practically those of an ordinary combustion, the substance being, however, not inclosed in glass bulbs, but dropped straight onto the back part of the mixture from a 3 C.c. weighed pipette.

The contents of the tube are afterwards digested in dilute hydrochloric acid, and any barium sulphate is then collected and weighed.—Chem. Zeit., 1893, 99, 130.

Sulphur Trade of Italy.—The exportation of sulphur from Catania surpassed that of 1891 by 20,948 tons. There is an increased exportation from Palermo, but the state of trade is depressing, owing to the constant excess in the output from the mines and consequent depreciation in value. —Pharm. Jour. Trans., 1893, 68; from Consular Rep., 1243.

Sulphur Industry of Sicily.—Ibid., 303; from Consular Rep., 297; Pharm. Era, 1893, 447.

Sulphur Industry of Japan.—Chem. and Drug., June 2, 1894.

Greek Sulphur Mines.—Chem. and Drug., 1893, 38 and 528.

TIN.

Solution of Stannous Chloride—Preparation of.—Hirsch-Schneider set out with chloride of tin in crystals, their object being merely to obtain a solution as directed in the German Pharm. as a reagent for arsenic.—Pharm. Centralh., 1893, 217.

Crystallized Tin Oxide.—Pure crystallized tin oxide has hitherto not been obtained directly from the metal, but either according to Deville's method (heating tin oxide to redness in a current of hydrochloric acid gas), or according to Danbráe's procedure (heating calcium oxide, or treating water with tin tetrachloride vapor). It is now reported that Emich has succeeded in preparing crystalline tin-oxide by heating tin in the air. If, after heating for 12 hours, the oxide deposited on the metal be examined, it will be found to consist of delicate, snow-white asbestos-like and flattened needles, with their longitudinal axes perpendicular to the plane of molten metal. This oxide is entirely insoluble in acids. If the tin used contains a small proportion of iron, the latter is oxidized with the first portions of tin; the iron may therefore be largely, if not entirely, removed after prolonged fusing.—Monatsh. f. Chem., 1893, 345.

Tin Determination.—The rapid detection of tin in salt solutions, even in presence of iron, copper, or other reducing substance, is effected by G. Dénigès, by means of a molybdo-sulphuric solution (molybdate of ammonium, 10 Gm.; distilled water, 100 C.c.; pure sulphuric acid, 100 C.c.). Several drops of the suspected solution are placed on a platinum dish with one drop of sulphuric acid, and a piece of zinc is placed on the platinum in contact with the liquid; after one or two minutes the zinc is removed, the dish washed under a thin stream of water, allowed to drain, and if a metallic stain is found on the platinum, at the place of contact with the zinc, it is wetted with 4 or 5 drops of hydrochloric acid, and evaporated to complete dryness. Several drops of water are now placed on the dry residue for several minutes, and one or two drops of the liquid so obtained are added to 2 or 3 C.c. of the molybdo-sulphuric solution, when an instantaneous blue coloration will show that tin is present in the solution examined.—Bull. de la Soc. de Pharm. de Bordeaux, 1893, 286; Amer. Jour. Pharm., 1893, 550.

THORIUM.

Preparation of Thorium Salts.—P. Jannasch, J. Locke and J. Leinsky (Zeitschr. Anorg. Chem., 1893, 283), publish the following procedures:

1. *Thorium Oxalate.* Finely pulverized orangite or thorite is treated

with concentrated hydrochloric acid, to which a few drops of nitric acid are added, and dried; the residue is impregnated with hydrochloric acid, and extracted with hot water. The filtrate is rendered weakly alkaline with ammonia; ammonium sulphide is then added. The whole is now heated to ebullition, acidulated with hydrochloric acid, and again heated to ebullition. The sulphides of the sulphuretted-hydrogen group can then be easily filtered off. The filtrate is boiled with a little nitric acid, and the precipitate produced by ammonia is filtered off and incinerated. The residue is fused with 20–25 times its quantity of soda in a silver crucible, to remove the alumina, which is removed by treating with hot water. The residue is dried, heated to a faint red, and then, in a finely powdered state, reduced by hydrogen. It is necessary, in the latter operation, to keep at a quite bright-red heat. The product is placed into diluted hydrochloric acid [1 : 3] containing nitric acid, and heated for some length of time on the water-bath, whereby the iron and cerite earths are dissolved. The residue is washed out with diluted hydrochloric acid [1 : 3], heated to redness, and then fused with a ten-fold quantity of sodium bisulphate (not potassium bisulphate). The molten matter is dissolved in cold water and heated to boiling, and ammonium oxalate then added. The precipitate forming at first is re-dissolved in an excess of ammonium oxalate; an insoluble deposit will consist of cerite-earth oxalates, which should be removed by filtering. By adding boiling hydrochloric acid to the boiling hot solution, the thorium oxalate is separated in a perfectly pure state; it is easly filtered off, after the mixture has been heated for 2 hours longer on the water-bath, and furnishes, after drying at 100° C., a pure white preparation, which, on being heated to redness, leaves pure thorium oxide behind. The authors recommend working only with 5–6 Gm. lots of orangite or thorite at a time: from this quantity they obtained about the same amount of oxalate.

2. *Thorium Bromide.* Pure thorium oxalate is decomposed by concentrated sulphuric acid, and the thorium hydroxide is separated by ammonia from its solution obtained with much water. As long as it is not had completely white, it should be re-dissolved with sulphuric acid, precipitated with ammonia, and washed with boiling water until no more sulphuric acid can be found in the filtrate. By dissolving the pure thorium hydroxide in pure hydrobromic acid, evaporating on the water-bath, dissolving with water, and allowing the clear solution to evaporate in vacuo over sulphuric acid, the thorium bromide is obtained in beautiful prismatic or acicular deliquescent crystals, decomposing at 100° C. Thorium iodide is similarly obtained in the same way and in similar form.

VANADIUM.

Vanadium—Determination of.—Hintz and Weber, in Zeitschr. f. anal. Chemie, 1893, 217, give a review of different methods. Reference is made to the important papers.

ZINC.

Zinc Borate.—Prepared by mixing hot filtered solutions of 25 Gm. zinc sulphate in 250 Gm. distilled water, and 20 Gm. borax in 500 Gm. distilled water; the precipitate is washed with cold distilled water until the washings give no further precipitate with barium chloride solution. After drying, the compound forms an amorphous white, powder, insoluble in water and alcohol, but soluble in both water of ammonia and hydrochloric acid. The frequent combination in prescriptions of zinc oxide and boric acid suggested the preparation.—W. Koll, Pharm. Post, 1893, 338.

——— Sieg. Kraus.—Ibid., 1893, 465.

Reduction of Zinc in the Wet Way.—Crude zinc oxide is boiled in a concentrated solution of magnesium chloride under a pressure of 2 to 3 atmospheres, and the solution then electrolyzed. The free zinc precipitates and the magnesium oxychloride formed is dissolved in hydrochloric acid and used again. (Industrie Blätter).—Amer. Drug. and Pharm. Rec., 1893, 189.

Crystallized Zinc-Silicate.—H. Traube obtained zinc silicate in crystalline form by reducing the amorphous silicate to a sulphate by the action of a solution of $Na_2S_2O_3$, containing a trifling alkaline excess, drying the sulphate quickly and keeping the same for eight days, at the highest possible heat, in contact with 8 times its weight of boric acid, the reaction taking place in a platinum capsule in a porcelain furnace. The greater portion of the boric acid was driven off by sublimation. Upon leaching the residue the zinc silicate was obtained as a white crystalline powder, insoluble in acids. Under the microscope the powder appears in crystals. Zinc silicate thus obtained is an isomorph of the mineral enstalite ($Mg.SiO_3$). The author proposes to obtain other crystalline silicates in a similar manner.—Nat. Drug., 1894, 188.

Ammonia in Zinc Dust.—Robineau and Rollin (Monit. Sci., vii., 138) find that zinc dust always contains ammonia, which cannot be removed by boiling with water. Complete removal is only attained by washing with boiling 1 per cent. H_2SO_4.

ZIRCONIUM.

Zirconium.—Prepared by L. Troost (Jour. Pharm. Chim., 1893, 76), by mixing intimately a quantity of zircon and the carbon of burnt sugar, and submitting this to the action of electricity under a slow current of carbonic acid gas, when the reaction takes place at once, producing a carbide of the formula, ZrC_2; this is then decarbonized by the further gradual addition of zircon. The product is steel-gray and extremely hard; unalterable at ordinary temperatures; burns with a bright flame, when it is carbonized, and is attacked by hydrofluoric acid, even when this is very dilute.

Thorium is prepared by the same process from thorine, the product being less hard than zirconium, decomposing water and altering in contact with moist air. On remelting the thorium carbide with an excess of thorine, a small quantity of a metallic substance was obtained which was not altered by air.

Selenium was submitted to the action of three solvents for ten hours, at the end of which time it was found that an abundant precipitate had been yielded by potassium carbonate solution, while dilute lactic acid dissolved a notably smaller quantity, and saliva only traces. Physiological experiments proved it to be much more toxic than sulphur, while in certain skin diseases, used as a salve in the proportion of 2 Gm. precipitated selenium to 30 Gm. vaseline, it was more efficacious than sulphur.—Demontporcelet and Ch. Féry ; L'Union Pharm., 1893, 249 ; Amer. Jour. Pharm., 1893, 453.

CHEMISTRY OF THE CARBON COMPOUNDS.

ACIDA.

Abietic Acid.—H. Mach. The various substances hitherto obtained from the resin of pine trees, and named respectively abietic, sylvic and pimaric acids, are shown to be identical ; the name abietic acid is retained. This acid occurs in colophonium in varying amount ; some specimens of the resin contain 90 per cent. of the crude acid, from others no acid could be isolated. The method usually adopted was to digest the resin with 70 per cent. alcohol, and recrystallize the residual acid from methyl alcohol ; or, in some cases, the crude acid was dissolved in 90 per cent. alcohol, precipitated with hydrochloric acid, and re-crystallized from methyl alcohol. Analyses and molecular weight determinations (cryoscopic and ebullioscopic) agree with the formula $C_{19}H_{28}O_2$. The acid forms white crystals, and melts at 153–154° C. when slowly heated, beginning to soften at 148°. The potassium salt, $C_{19}H_{27}KO_2, 3C_{19}H_{28}O_2$, was prepared by neutralizing an alcoholic solution of the acid with alcoholic potash, or boiling it with potassium carbonate ; it forms bundles of silky needles, and melts at 183° C.—Monatsh. f. Chem., 1893, 186.

ACETIC ACID.

Mineral Acids in Vinegar.—The Chem. Zeit. (Rep.), 1893, 273, recommends the following test. A cubic centimetre of the vinegar is placed in a capsule and one drop of an alcoholic solution of rosaniline hydrochloride (25 gr. fuchsin in 100 C.c. 90 per cent. alcohol) added. If the vinegar is pure the liquid will retain a reddish-violet color ; if mineral acids are present, even to the extent of one per cent., the liquid becomes dirty yellow. The characteristic color of fuchsin is again restored after neutralizing with alkali.

Free Mineral Acids in Presence of Organic Acids.—E. Nickel recommends the following process for detecting hydrochloric acid in vinegar: weigh the sample with a large quantity of phloroglucinol and then boil for some time with a piece of pine wood or bamboo. After further contact for about 12 hours, the wood will assume the well-known characteristic color if any free mineral acid is present.—Chem. Zeit., 1894, 1670.

Rectified Acetic Acid.—G. Buchner shows the test in Pharm. Ger. Edit. III., to be insufficient for determining between rectified acetic acid and a mixture of vinegar containing crude acetic acid.—Chem. Zeit., 1893, 1319.

Hydroxylamineacetic Acid.—A. Werner has previously shown that benzenylchloroximeglycollic acid exists in two isomeric forms, and has now made further experiments in order to ascertain if possible the stereometric formula of the two isomerides. These have been unsuccessful owing to the fact that the products obtained are oils which can scarcely be distinguished from one another.—Ber. d. Chem. Ges., 1893, 1567.

ACONITIC ACID.

Formation of Pyrroline Derivatives from Aconitic Acid.—S. Ruhemann and F. E. Allhusen.—Jour. Chem. Soc., 1894, 9.

ACRYLIC ACID.

Acrylic Acid.—Prepared by C. L. Moureu from β-chloropropionic acid, for which the author gives his process, as follows: β-chloropropionic aldehyde, $CH_2Cl–CH_2–CHO$, is oxidized by nitric acid, of 1.47 density, gradually added; the reaction is very violent, and cooling is necessary; the product is heated over a water-bath, the container then surrounded with ice and cooled to 0° C. About two-thirds of the acid are recovered and placed over lime in a vacuum. For extracting the β-chloropropionic acid remaining in the drying oil, the latter is dilued with four times its volume of water, and exhausted with ether; the ethereal solution leaves upon distillation a syrupy residue, which is heated on the water-bath for several hours and solidified by cooling.

The resulting acid is heated with aqueous solution of potassium or sodium hydroxide, and after cooling dilute sulphuric acid is added in a quantity exactly calculated to saturate the alkali in excess and displace one molecule of acrylic acid. The liquid is then distilled until litmus is scarcely reddened, when about four litres of aqueous solution of pure acrylic acid will have been obtained. The analysis of the acrylates of lead and sodium gave, respectively, the following results, showing the purity of the acid:

Per cent. of Pb,	59.45 found;	59.24 calculated.
" Na,	24.32 "	24.47 "

—Jour. Pharm. Chim., 1893, 16.

BENZOIC ACID.

Odor of Benzoic Acid.—J. Passy, continuing his work on the limits of perceptibility of odors, points out that, while stearic acid is odorless, and its aldehyde, alcohol, and ethers the same, in the case of benzoic acid and its associated compounds the acid alone is odorless, and this only when pure and in the crystalline form. If diluted with any medium the characteristic odor at once reveals itself, as was proved experimentally when the acid was diffused in aqueous vapor or an aqueous solution warmed. A similar result was produced by the spontaneous evaporation of a one per cent. alcoholic solution on a watch-glass or a piece of filter paper. Aronsohn has shown that, though the odors cannot be perceived when solutions of odorous substances in pure water are introduced into the nostrils, this is due to the action of the water on the olfactory cells, and may be overcome by dissolving 0.6 per cent. of sodium chloride in the liquid and warming the latter to the temperature of the body. Under similar conditions the otherwise inodorous benzoic acid, in the proportion of one part in one thousand, yielded a clearly perceptible odor. Identical results to the above were obtained with cinnamic acid. Passy considers, therefore, that these compounds may fairly be regarded as odorous, as much so as vanillin, coumarin, and other compounds of the aromatic series, which are odorless below the temperature at which they volatilize. He concludes also that the so-called inodorous bodies may be divided into two categories: 1. Those which are, for normal human beings, beyond the limits of perceptibility by the sense of smell, such as stearic and other fatty acids, beyond the fourteenth term. 2. Those which may, under ordinary conditions, have no perceptible odor, such as benzoic and cinnamic acids, etc.—Compt. rend., cxviii., 481.

Isomerism of the Nitrobenzoic Acids.—O. de Koninck. The ortho- and meta-isomers are easily soluble in water and dilute alcohol, but the para-isomer is very sparingly soluble. In ether the similarity is of the same order; in chloroform and benzene the distinction is less well marked. In light ligroine and carbon disulphide the meta-compound is the most soluble, whilst the ortho- and para-compounds approach each other by their total or almost total insolubility.—Compt. Rend., cxviii., No. 9.

——— O. de Koninck. In the group of the nitro-benzoic acids the ortho-isomer approaches sometimes to the meta- and again to the para-isomer.—Compt. Rend., cxviii., No. 10.

——— *A Comparative Study of the.*—O. de Koninck has determined the co-efficients of solubility for these three acids at temperatures equal to or below the ordinary temperature. He has also studied, methodically, the action of sulphuric and common nitric acid, in which they dissolve with a faint yellow color, whilst the amido-benzoic acids all three dissolve with a garnet-red color in the mono-hydrated nitric acid. The action of fuming nitric acid differs little from that of ordinary nitric acid.—Compt. Rend., cxviii., No. 20.

—— A continuation of this study in Ibid., No. 22.

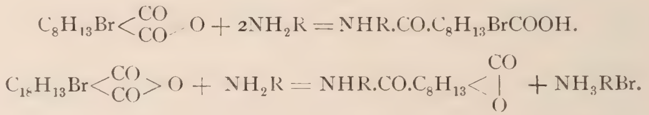
Preparations of p-Brom-m-oxybenzoic Acid.—Equal molecules of m-oxybenzoic acid and bromine are heated at a temperature between 30° and 40° C., in a suitable solvent, as, for instance, carbon bisulphide, glacial acetic acid, chloroform or carbon tetrachloride. The acid is very soluble in hot but not as freely soluble in cold water. It crystallizes from the latter in reddish-colored needles. If heated with caustic soda to a temperature of 170° to 200° C., it is completely converted into protocatechuic acid.—Meyer Bros. Drug., 1894, 13.

CAMPHORIC ACID.

Camphoric Acid and Its Derivatives.—See Compt. rend.; Ber. d. Chem. Ges.; Rec. Trav. Chim.; Annal. der Chem.; abstracts in Jour. Chem. Soc. and Chem. News 1893–94).

Camphoric Acid Derivatives.—H. Rupe and C. Maull. Bromocamphoric anhydride is readily prepared according to Volhard's method by the action of bromine and phosphorus on camphoric anhydride; it easily reacts with certain bases, crystalline compounds of the type $NHR.C_8H_{13}C_2O_3$ have been obtained with aniline, paratoluidine, phenylhydrazine, and piperidine.—Ber. d. Chem. Ges., 26, 1200–1202.

Camphoric Acid.—K. Anwers and H. Schnell. The action of bases on bromocamphoric anhydride takes place in correspondence with the equation:



$$C_8H_{13}Br<\begin{matrix}CO\\CO\end{matrix}O + 2NH_2R = NHR.CO.C_8H_{13}BrCOOH.$$

$$C_{18}H_{13}Br<\begin{matrix}CO\\CO\end{matrix}>O + NH_2R = NHR.CO.C_8H_{13}<\begin{matrix}CO\\|\\O\end{matrix} + NH_3RBr.$$

—Ber. d. Chem. Ges., 26, 1517–1532.

CATHARTIC ACID.

Cathartic Acid.—Jensz prepares this acid by evaporating an infusion of senna in vacuo, mixing the residual extract with an equal volume of alcohol, shaking well and leaving the mixture to settle for twelve hours. After decanting off the liquid, the deposit is again shaken with alcohol, and finally pressed. The filtered liquids are then precipitated with lead acetate, the precipitate separated and well washed by kneading with water until the washings pass away clear. The partially dried precipitate is mixed with alcohol and decomposed with sulphuretted hydrogen, excess of the gas driven off by passing a stream of carbonic acid or air through the liquid, then heating the whole in a vessel fitted with a reflux condenser, filtering to separate lead sulphide, and washing with alcohol. The clear liquid is then mixed with ether as long as a pale yellow deposit is produced, which is allowed to settle. After pouring off the ethereal liquid, the brown deposit on the sides of the vessel is washed with ether or strong alcohol, dissolved in a very small quantity of 30 per cent. alcohol, and evaporated at a temperature not exceeding 50° C. The preparation so obtained amounts to from 0.6 to 0.75 per cent., and it is sufficiently pure for medicinal use. Cathartic acid is described as having the characters of a glucoside, and a composition represented by the formula $C_{30}H_{36}NO_{15}$. It is soluble in hot water and alcohol. The dose is given as 0.10 to 0.15 Gm. —Pharm. Zeitsch. für Russland, xxxii., 744; (See, also, Nouv. rem., ix., 368).

Cathartic Acid.—This acid, supposed to be the active principle of senna, has never, like aloin, given very satisfactory results—i. e., in proportionate weights it is much more feeble than senna itself. It has been a question whether the somewhat tedious process of isolation hitherto adopted did not alter the constitution of the acid in some way, and there is correlative proof to that in the fact that by a new process a Dorpat student has obtained a cathartic acid which Kobert finds to be an active aperient in doses of 1 to 1½ grains, catharsis being produced in from three to eight hours. The process was as follows: 2 kilos. senna-leaves were covered with boiling water; after twenty-four hours the liquid was expressed and evaporated in vacuo, the residue treated with 95 per cent. alcohol for twenty-four hours, and the liquid decanted; this operation was repeated, and the combined and filtered alcoholic solutions precipitated by neutral acetate of lead; the precipitate was thoroughly washed, made into a paste with alcohol and decomposed with hydrogen sulphide; the excess of the latter was removed by a current of air, the mixture heated on a steam-bath for half an hour (using an inverted condenser), and the alcoholic solution separated: the residual lead sulphide was again extracted, and the combined filtrates mixed with ether, which caused the separation of a pale yellow precipitate; this was dissolved in 30 per cent. alcohol and evaporated at a temperature not exceeding 50° C. The yield was 12–15 Gm. the product is amorphous, difficultly soluble in cold water, readily soluble in boiling water: the best solvent is a 30–40 per cent. alcohol; ether, benzine, chloroform and petroleum ether are without solvent action The formula from the results of combustions appears to be $C_{30}H_{36}NO_{15}$.—Chem. and Drug., 1893, 487. (See also Bull. Pharm., 1893, 303.)

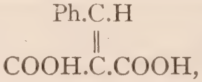
CEPHALANTIC ACID.

Cephalantic Acid Compounds.—Ed. Claasen has prepared magnesium, calcium, barium, sodium and aluminium compounds.—Pharm. Rund., 1894, 107.

CINNAMIC ACID.

Cinnamic Acid with Hydrocarbons—Condensation of.—W. Karsten.—

Cinnamic acid undergoes condensation with toluene and metaxylene in presence of sulphuric acid in the same manner as with benzene, forming phenyltolylpropionic and phenylxylylpropionic acids.—Ber. d. Chem. Ges., 1893, 26, 1579–1583.

Allocinnamic Acid—New Synthesis of.—C. Liebermann.—Claisen and Crismer have shown that when benzalmalonic acid, CHPh : $C(COOH)_2$, is heated at about 195° C., it splits up into carbonic anhydride and cinnamic acid. The author has repeated the experiment, heating the acid in quantities of 20–25 Gm. in an oil-bath at 195° for 6–9 minutes, and finds that under these conditions about 5–6 per cent. of the benzalmalonic acid is converted into allocinnamic acid, the remainder being converted into cinnamic acid. Benzalmalonic acid has in all probability the stereometric formula,  $\begin{array}{c}\text{Ph.C.H}\\ \|\\ \text{COOH.C.COOH,}\end{array}$ and the formation of allocinnamic acid in this manner is therefore an additional proof of the supposition that the two acids are stereoisomerides.—Ber. d. Chem. Ges., 1893, 26, 1571–1574.

Cinnamic Acid Derivatives.—See works of Erlenmeyer, Liebermann, Hartmann, etc., in Ber. d. Chem. Ges.; Anal. der Chem.; Compt. Rend.; Abstracts in Jour. Chem. Soc.; Chem. News (1892–93).

CITRIC ACID.

Citric Acid from Glucose.—C. Wehmer claims to have prepared citric acid by the fermentation of glucose. He states that the acid is a secretion product of certain moulds, being formed in a manner analogous to that in which glucose is transformed into lactic and acetic acids by the action of bacteria.—Compt. Rend., cxvii., 332; Pharm. Jour. Trans., 1893, 182.

Citric Acid—Artificial Production of.—In studying the conversion of sugar into oxalic acid under the influence of certain fungi, C. Wehmer discovered another analogous kind of fermentation by which citric acid is produced from sugar (see above). The change is probably the result of a process of oxidation represented by the following equation:

$$C_6H_{12}O_6 + 3O = C_6H_8O_7 - 2H_2O.$$

A full description of the conditions under which it takes place was given in a paper communicated to the Berlin Academy of Sciences last June. This mode of producing citric acid is now being worked at Thann and Mulhausen, and there is a prospect that, in addition to its scientific interest, it will be of industrial importance. In connection with this subject the Kew Bulletin calls attention to the interesting coincidence that citric acid has been found in sugar-cane juice, and that it sometimes makes its appearance during the process of sugar manufacture.—Pharm. Jour. Trans., 1894, 893.

Presence of Lead in Citrates.—F. W. Haussmann finds that lead is soluble in cold citric acid. The presence of lead sulphate in oil of vitriol is well known. On examination, potassium citrate of commerce contained particles of lead. The source of the metal was doubtless due to the impure condition of the acid, with omission by the manufacturer to filter the solution after saturation, and before evaporating. It may also be possible, however, that concentration and granulation of the salt was performed in lead-lined vessels. The presence of metallic lead in citrates is perhaps of little significance, as long as it remains in this state, but it becomes of graver importance, if, in some manner, it is dissolved and contaminates the salt. Such is, in many instances, actually the case.

Citrate of Lead.—The question may be asked, in what form the metal exists in citrates, and the logical conclusion is—as lead citrate. This salt is stated by most text-books to be insoluble in water. According to Watt's Dictionary of Chemistry the salt, if prepared by double decomposition between lead nitrate and sodium citrate, crystallizes with three molecules of water. An acid citrate, which is stated to be crystalline and very soluble in water, is also mentioned together with several others. Lead citrate was prepared with a view of determining its solubility in water, by two methods, first by saturating boiling solution of citric acid with the official lead carbonate, and second by the decompositon of lead acetate by a purified solution of potassium citrate. In the saturation process the lead citrate precipitated as soon as formed, with evolution of CO_2. After cooling the supernatant liquid was filtered from the precipitate, and on examination gave heavy precipitates with reagents for lead. This would indicate that lead citrate, prepared by saturation, is soluble in water to some extent.

The salt, prepared according to the second method, by precipitation, was carefully washed to remove the potassium acetate. The washings, even if they were made repeatedly until no sign of the acetate remained, invariably gave indication of the presence of lead. Subsequent examination of the dry salt showed it to be slightly soluble in water. The addition of an excess of potassium or any other soluble citrate greatly favors solution of the salt. If a solution containing lead citrate with an excess of potassium citrate is allowed to stand, the salt will again deposit in a mass of soft crystals after a short time. This also takes place if the official solution of magnesium citrate is substituted for the potassium salt. The same experiments were repeated with the citrate, prepared from lead nitrate in place of the acetate, with identical results. The statement of the insolubility of lead citrate in water must therefore be accepted as not being invariably the case, especially in the presence of other citrates.

If the lead present in commercial samples of potassium citrate exists in the form of this salt, its ready indication upon the application of reagents to perfectly clear aqueous solutions is explained.

Ammonium citrate, lithium citrate and the official solutions of citrates contained lead. Caffeine citrate was free from any metallic impurity.—Amer. Jour. Pharm., 1894, 173.

EMBELIC ACID.

Embelic Acid is an acid extracted from Embelia ribes (Myrtaceæ). It occurs in small orange-red crystals, easily soluble in alcohol, but insoluble in water. It is used as a remedy for tapeworms.—Brit. and Col. Drug., 1894, 202.

FORMIC ACID.

Estimation of Formic Acid.—This acid may be quickly and accurately estimated by titration in alkaline solution with permanganate of potassium. The following reaction takes place:

$$3KCHO_2 + 2KMnO_4 = 2MnO_2 + 2K_2CO_3 + KHCO_3 + H_2O$$

—A. Lieben, in Monatsh. f. Chem., 1893, 740.

FULMINIC ACID.

Fulminic Acid and its Derivatives.—R. Scholl gives a historical survey of fulminic acid, and discusses the various formulæ which have been suggested for it; he considers, with Steiner, that its properties and modes of formation are best explained on the assumption that it is dioximidœthylene, NOH : C : C : NOH.—Chem. Centralb., 1893, 730.

GYMNEMIC ACID.

Gymnemic Acid.—The active principle of Gymnema sylvestris is gymnemic acid, the formula of which is $C_{32}H_{55}O_{12}$. It presents itself in the form of a greenish-white powder, having a sharp, acid taste, and is very soluble in alcohol, but slightly soluble in water and ether. When the tongue is touched with gymnemic acid the taste is completely lost for sweet and bitter. The subjects of experiment are incapable of perceiving the taste of quinine or of sugar, while that of acid, salty, astringent, or spicy substances is completely recognized. Availing himself of this fact, Quirine recommends before administering bitter remedies, that the mouth be rinsed with a 12 per cent. solution of gymnemic acid in alcohol and water.—V. Oefele, in La Médecine Moderne; Rundschau, 1893, 996.

LACTIC ACID.

Resolution of Lactic Acid into its Optically Active Components.—T. Purdie, in Jour. Chem. Soc., 1893, 1143.

MALIC ACID.

Estimation of Malic Acid.—C. Micko. To facilitate the separation of malic acid in wines by means of lead acetate, the author evaporates 100 C.c. of wine, or 50 C.c. of cider to a few C.c., sets aside for an hour with

4 or 5 C.c. of binormal sulphuric acid, then, while agitating continuously, gradually mixes in 50 C.c. of strong alcohol and 50 C.c. of ether. After 6 to 10 hours, filtering and washing with ether-alcohol ensue, and the ether and the alcohol are subsequently expelled by distillation over a water-bath, but finishing off in a vacuum. Chlorides are removed from the residue by cooling it to 50° or 60° C. and adding the smallest possible excess of freshly prepared silver sulphate and filtering. The filtrate is neutralized with potassium carbonate, evaporated to a small volume, and is ready to be further treated for the separation of malic acid.—Chem. News, 1893, 286.

Malic Acids—Substituted.—Paper by P. A. Guye that may be regarded as an appendix to Colson's controversy with Friedel and Le Bel.—Compt. rend., 1893, No. 20.

MUCIC ACID.

Mucic Acid from Gum Arabic—Preparation of.—E. Maumené. The variable yield of mucic acid is partly attributable to the fact that little attention is generally paid to the concentration and proportion of the nitric acid employed, and partly to the actual condition of the gum. The author discusses the first of these points at length, and gives details of previous works on the subject; he considers that gum arabic is a mixture of two varieties, which he designates by α- and ν-; both of these undergo condensation on heating or by the action of sulphuric acid, and it is from this condensation compound that mucic acid is chiefly or wholly obtained. —Bull. Soc. Chim., 1893, 138.

OLEIC ACID.

Commercial Oleic Acid—Examination of.—C. Dieterich (Helfenberger Annalen, 1891, 10), finds that from 178.83 to 194.13 Mgm. potassium hydroxide are required to saturate 1 Gm. of the acid. Hence 90 per cent. of oleic acid is the minimum in a good sample.

Oleic Acid.—Dieterich compares an examination of commercial with pure oleic acid. Pure oleic acid had iodine figure 89.8 to 90.05. The commercial samples had 65.03 to 86.18, and showed 83.90—98.70 per cent. oleic acid.—Helfenberger Annalen; Pharm. Post, 1894, 436.

Structure of Oleïc, Erucic, and Isomeric Acids.—A. Saytzeff.—Tables of melting points, showing the correspondence of the oleïc with the erucic series of isomeric acids. The author considers oleïc and elaïdic acids to be geometrically isomeric, whilst iso-oleïc acid is a structural isomeride.—Jour. Russ. Chem. Soc.. 1893, 504.

OXALIC ACID.

Oxalic Acid—Detection and Determination.—A. Gunn employs a solution of ferrous phosphate containing about 12.5 per cent. $Fe_3(PO_4)_2$, with excess of phosphoric acid and a standard solution of oxalic acid, of which

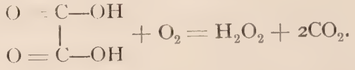
100 C.c. contains 1 Gm. The apparatus required: Nessler's glasses; burette, 20 C.c. in $\frac{1}{10}$s, and with a fine outlet; graduated cylinder, 100 C.c.; graduated cylinder, 50 C.c.; pipettes, 5 C.c. Test is color reaction. Oxalic acid may be detected when 0.75 per cent. or less is present in a mixture of tartaric acid and alum. In the absence of alum, mixtures of tartaric acid and oxalic acid are determined with fluorescein. Color reaction is destroyed by strong mineral acids. Temperature does not affect the color. And only one substance produces a tint resembling the oxalate color, and that is antipyrine.—Pharm. Jour. Trans., 1893, 408.

Combination of Oxalic Acid with Titanic and Stannic Acid.—E. Péchard. Oxalic acid yields, with tannic and stannic acids, definite compounds.—Compt. rend., 1893, No. 26.

Some New Complex Oxalates.—F. Kehmann and N. Pickersgill. The following have been prepared and analyzed: $K_2NaFe(C_2O_4)_3$, green octahedra; $KNa_2Al(C_2O_4)_2 + 4H_2O$, triakis tetrahedra; $KNa_2Cr(C_2O_4)_3 + 4H_2O$, dark colored triakis tetrahedra; $KNa_2Co(C_2O_4)_3 + 4H_2O$, dark green triakis tetrahedra.

Potassium cobalt oxalate and barium chloride give barium cobalt oxalate, $Ba_3Co_2(C_2O_4)_6 + 12H_2O$, as tiny green needles. Potassium aluminum oxalate, $K_3Al(C_2O_4)_3 + 3H_2O$, forms colorless mono-symmetric prisms.—Zeitschr. f. anorg. Chem., 1893, 133.

Action of Light on Oxalic Acid.—A. Richardson (Jour. Chem. Soc., 1894, 450). The action of oxygen on oxalic acid in the presence of light gives rise to hydrogen peroxide and carbon dioxide.



$$\begin{array}{l} O=C-OH \\ \quad\;\;| \\ O=C-OH \end{array} + O_2 = H_2O_2 + 2CO_2.$$

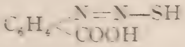
In an open vessel the yield is only one-tenth that required by theory. In presence of H_2SO_4 the H_2O_2 first increases, rising to a maximum, and then it decreases; the passage of air or oxygen increases the yield of peroxide, and the stability of the hydrogen peroxide is due to the presence of the oxygen in solution.

Oxalic Acid Manufacture.—It may be prepared according to a process of Liefchutz, by acting on wood with dilute nitric acid, in the presence of sulphuric acid, separating the intermediate product from the acid liquor, which contains in solution the oxalic acid formed, and subjecting the intermediate product to a further treatment to remove the remaining incrusting matters from the cellulose. As to the acid liquor, it is set aside and subsequently treated in a process for recovering the oxalic acid. The oxalic acid dissolved in the weak nitric acid can be obtained direct in the crystalline form, by repeatedly using the separated acid liquors for the treatment of fresh wood.—West. Drug., 1893, 364.

Oxalic Acid Used as an Emmenagogue.—See abstracts in Amer. Jour. Pharm., 1893, 388 and 551.

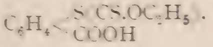
SALICYLIC ACID.

Thiosalicylic Acid and Ortho-sulphobenzoic Acid.—Sulphuretted hydrogen precipitates from ortho-diazobenzoic acid a red substance of the formula:



$$C_6H_4 <\begin{matrix} N=N—SH \\ COOH \end{matrix}$$

By boiling with water or—more easily—with alkalies, carbonates of the alkalies, or ammonia, this compound is converted into thiosalicylic acid, $S_2(C_6H_4COOH)_2$, with the liberation of nitrogen. Sulphuretted hydrogen may be replaced (Rundschau, 1893, No. 28) by the sulphides (sulphohydrates) of the alkalies, ammonia or alkaline earths, as also by the salts of thiocarbonic acid (especially the xanthogenates). When the latter are employed, the sulphurous diazo-combination does not, when heated with water, produce thiosalycilic acid directly, but a derivative of it,



$$C_6H_4 <\begin{matrix} S.CS.OC_2H_5 \\ COOH \end{matrix} .$$

which passes into thiosalicylic acid by being saponified with alkalies. Ortho-sulphobenzoic acid is obtained from thiosalicylic acid by oxidation.

Concentrated Solution of Salicylic Acid.—Various efforts have been made to increase the solubility of salicylic acid with the view of obtaining solutions sufficiently concentrated to be endowed with eminently antiseptic properties. Jandon (Rep. de Pharm., 1893, 341), prepares a solution containing 8 per cent. of salicylic acid, which, he asserts, yields very good results in practical surgery. First, he dissolves 2 parts of salicylic acid in 6 parts of 90 per cent. alcohol; and then dissolves 1 part of borax in 2 parts of neutral glycerin. The two solutions are now mixed, and a sufficient quantity of distilled water is added to make 25 parts.

Hexahydrosalicylic Acid.—A. Einhorn and R. Willstätter. By the action of sodium on salicylic acid in amylic alcoholic solution hexahydrosalicylic acid, $OH.C_6H_{10}.COOH$ is formed, together with a mixture of various other acids which have not been investigated. It is readily soluble in water, and crystallizes in prismatic needles or tetragonal plates, melting at 105° C. The acid gives no coloration with ferric chloride, and, in alkaline solution, decolorizes potassium permanganate slowly; it boils without decomposition under the ordinary pressure, and the odor of the vapor resembles that of the higher fatty acids; the crystals are odorless.—Ber. d. Chem. Ges., 1893, 2913.

——— The authors find that this substance, M. P. 105° C., is not hexahydrosalicylic acid, but pimelic acid.—Ibid., 1894, 331.

Diiodosalicylic Acid.—According to Boni, (Giorn. farmac. Trentino), this is prepared by dissolving 10 parts of salicylic acid in boiling water and gradually adding an alcoholic solution of iodine as long as the iodine is taken up, and the solution gives no characteristic iodine-starch reaction. —Nat. Drug., 1893, 58.

Preparation of Salicylic Acid.—S. Marasse has patented the following process: Allow carbon dioxide to act on an intimate mixture of phenol and potassa in a closed vessel at an elevated temperature, the potassa being in excess. The salicylic acid formed is separated by precipitation with a mineral acid and subsequently purified.—Amer. Drug. and Pharm. Rec., 1894, 184.

Danger from External Use of Salicylic Acid.—Drug. Circ., 1894, 10.

SUCCINIC ACID.

Succinic Acid—Estimation of.—A. Rau has devised a method for estimating succinic acid in wine.—Zeitschr. f. anal. Chem., 1893, 482; from Arch. f. Hygiene, 1893, 225; Jour. Chem. Soc. (Abs.), 1893, 557.

SULPHOCARBOLIC ACID.

Sulphocarbolic Acid.—Sulphocarbolic Acid (Sulphophenylic, Sulphophenic, Phenolsulphonic or Phenylsulphuric Acid; Sulphophenol, Sulphocarbol), C_6H_4,OH.SO$_3$H, is obtained by mixing equal quantities of carbolic acid and concentrated sulphuric acid in the cold, saturating the excess of acid with barium carbonate, filtering, and evaporating at a low temperature or in vacuo. As ordinarily met with in commerce, it is a reddish, volatile, syrupy fluid, of a strong, but not disagreeable odor; it forms salts with alkalies and various metals, and yields a violet coloration with ferric chloride. Sulphocarbolic acid is considered a powerful antiseptic and antizymotic—equal, if not superior to carbolic acid, while being relatively non-poisonous, less irritating, and more soluble. Its therapeutic uses are identical with those of phenol. Externally, it is applied in $\frac{1}{5}$–1 per cent. aqueous solutions; internally, it is usually given in doses of 10–30 centigrammes. Solutions of sulphocarbolic acid in oil, glycerin, or alcohol, are said to be well-nigh void of bactericidal power.

TANNIC ACID.

Tanning Materials—Analysis of.—A. Gawalowsky. An extract of the material is precipitated with the smallest possible excess of copper acetate, and after a time is filtered by suction through a dried and weighed filter; the precipitate is washed with cold water, dried until the weight is constant and incinerated. The ash is dissolved in nitric acid and again ignited to determine the copper as oxide. The difference gives the total tannin, gallic acid, pectin, etc. Another part of the extract is evaporated to a syrup, treated with alcohol ether (2 : 1), and the pectin with traces of albumin and casein filtered off; the alcohol-ether is evaporated from the filtrate and the residue dissolved in hot water and filtered from fat resin. The cold filtrate is now mixed with copper acetate and ammonium hydrogen carbonate; this precipitates the tannin, leaving copper gallate in solution. The pectin precipitate is dissolved from the filter with hot water, and the cooled solution precipitated with copper acetate. Both these precipitates are treated like the former one; the gallic acid is then known from the difference.—Zeitschr. f. anal. Chem., 1893, 618: from Brestowski's Handworterbuch für Pharmacie.

Extraction of Tanning Material.—V. Schroeder and A. Bartel record results of extraction of tannin in pine by boiling, and remark upon the results obtained by boiling.—Chem. Zeit. (Rep.), 1893, 232.

Report on the Progress in Tanning and Tanning Materials.—A. Fölsing in Chem. Zeit., 1893, 1770.

Determination of Tannin.—Reviews of the different methods of determination of tannin which have appeared in the following: Proctor (Deutsch. Amer. Apoth. Zeit., x., 276); Fleury (Jour. de Pharm. et de Chim. [5], 25, 499; Bull. Soc. Chim. de Paris [3], 7, 687); Merphugs (Zeitschr. f. Nahnugo.-Unter. w. Hygiene; der Gerber, xviii., 288); A. Gawalowsky (Handwörterbuch de Pharmacie); H. R. Proctor (Jour. Soc. Chem., Ind., xi., 329); Eitner (Der Gerber, xiii., 245); H. Trimble (Proc. Franklin Ins., iv., 23); Trimble and Peacock (Amer. Jour. Pharm., 23, 161).—Zeitschr. f. Anal. Chem., 1893, 616.

Tannoids.—Material for a monograph on the tannoids, with special reference to vegetable physiology, by J. C. Bay.—Amer. Rep. Missouri Bot. Gard., 1894, 61.

To Prepare Pure Tannin, as light in color as possible, P. Sisley (Bull. Soc. Chim., 1893, 755) proceeds in the following manner: Galls, specially selected and freed from dark-colored ingredients, are coarsely powdered and introduced into a wide-necked bottle provided at its lower part with a stop-cock. Distilled and freshly boiled (but cooled) water is poured over the galls, and the mixture is allowed to stand in the cold for 36–48 hours. A solution but slightly colored and rich in tannin is thus obtained, from which coloring matter is still further removed by the addition of lead acetate (15 Gm. to the litre) dissolved in the minimum quantity of water. The mixture is vigorously stirred and strained through wool. A straw-colored fluid is thus obtained. Every 5 litres of this extract are shaken with 1.7 litres of pure ether and then set aside to settle. The ethereal mixture, containing the tannin, is now dissolved in the minimum quantity of water, and washed three times more with ether. The extract is finally spread on glass plates, to be dried in vacuo over sulphuric acid. Tannin thus prepared is described as a white, odorless powder, yielding perfectly colorless and clear solutions with water in every proportion; with lead acetate it produces a purely white precipitate.—Chem. Zeit., 1893 (Rep.), 278.

Determination of Tannin by Lowenthal's Method.—H. Snyder (Jour. Amer. Chem. Soc., 1893) points out the following possible sources of error in estimation of tannin by titration with permanganate solutions: 1. Deterioration of the gelatin solution whereby oxidizable products are formed and a low result obtained. 2. Different conditions of time and temperature between the titration made while the tannin is in solution and after it is removed by the gelatin. 3. Incomplete precipitation of the tannin by the gelatin. He advises the use of sterilized gelatin solution, and a blank test of it with the permanganate solution.

Poisonous Effect of Tannic Acid.—T. W. Bell contributes to the New Zealand Med. Jour. a note in regard to the possible poisonous action of tannic acid.—Drug. Circ., 1894, 11.

TARTARIC ACID.

Formula of Ordinary Tartaric Acid.—A. Colson. A reply to Friedel and Le Bel, containing also an allusion to Guye's conception of the "product of asymmetry."—Bull. Soc. Chim., 1893, 87.

Solvent Action of Tartrates.—H. N. Warren finds that the solvent action of Rochelle salt on metallic hydrates and carbonates, exemplified in ferric and cupric compounds, extends to ferrous compounds and to the hydrates and precipitates of zinc, manganese, nickel, cobalt, chromium, and aluminum. The precipitates of barium, strontium, magnesium, and calcium compounds are also to a considerable extent soluble when boiled with a concentrated solution of the tartrate, and both antimony and bismuth oxychlorides, as well as stannic compounds, are entirely dissolved on heating with a sufficient quantity. Cadmium carbonate is practically insoluble in a neutral tartrate solution, and cadmium compounds in solution may thus, by suitable means, be distinguished from cupric salts.—Chem. News, 1894, 125.

Sunlight Decomposition of Tartaric and Citric Acids.—Liebig observed that a solution of tartaric acid is decomposed by manganese peroxide, yielding carbonic anhydride, and a substance that reduces cupric oxide. Malic acid under the same conditions is decomposed into aldehyde and carbonic anhydride, while citric acid yields acetone and carbonic anhydride. W. Seekamp finds that solutions of these acids undergo similar decomposition under the influence of sunlight when uranium oxide is present, and it is considered that the action of this substance is due to its power of absorbing the chemically active rays. A solution of five per cent. tartaric acid and one per cent. uranium oxide exposed to sunlight becomes green from reduction of the oxide. Gas is evolved, and the solution acquires a peculiar odor. On removing the aldehyde by distillation after some months, the solution was found to contain malic acid and succinic acid, besides unaltered tartaric acid and a reducing substance that was not identified. The decomposition is described as consisting first in the conversion of tartaric acid into oxalic acid and the reducing substance ($C_2H_4O_2$):

$$C_4H_6O_6=C_2H_4O_2+C_2H_2O_4.$$

The oxalic acid is then decomposed by sunlight:

$$C_2H_2O_4=CO_2+CO+H_2O$$

and the carbonic oxide reduces the tartaric acid successively to malic and succinic acids:

$$C_4H_6O_6+CO=C_4H_6O_5+CO_2$$
$$C_4H_6O_5+CO=C_4H_6O_4+CO_2.$$

The malic acid is converted into aldehyde and oxalic acid:

$$C_4H_6O_5=C_2H_4O+C_2H_2O_4.$$

and, finally, the succinic acid gives propionic acid and carbonic anhydride. —Ann. der Chem., 1894, 373.

Lead in Tartaric and Citric Acids—Detection and Estimation of.—R. Warington first calls attention to the occasional presence of visible fragments of metallic lead, probably fine scrapings of metallic lead left by plumbers when mending the leaden vessels. Both tartaric and citric acid crystals have occasionally attached to their base, where they have been in contact with the leaden vessel, patches of an opaque, whitish substance, which is evidently a portion of the corroded surface of the lead removed by the crystal. This substance does not always entirely dissolve in water, but it does so very rapidly when excess of ammonia is added. The author has, however, generally found the lead to pass into the aqueous solution. After describing the various pharmacopœia tests, British and foreign, for the detection of lead in tartaric and citric acids, the author finally recommends the following process; 40 Gm. of the sample is dissolved in a little water and pure, strong ammonia is added in slight excess; the liquid is then cooled and diluted to 120 C.c. As a preliminary experiment, 10 C.c. is taken, diluted to 50 C.c., and mixed in a Nessler tube with 1 drop of solution of ammonium sulphide; the color developed indicates what volume of solution should be taken for the determination, and this may range from 5 to 50 C.c. The tint has now to be matched with the pure solutions. A volume of pure ammoniacal tartrate or citrate solution identical with that taken of the acid under examination, is mixed with a measured quantity of a slightly acid lead nitrate solution, containing 0.1 Gm. of metallic lead per litre. A drop of ammonium sulphide is then added, and, should the coloration be too light or too dark, the experiment must be repeated until a perfect match is obtained, just as in Nesslerizing water. The amount of iron present in commercial tartaric or citric acid is, as a rule, too small. A considerable amount of iron will be at once indicated by an abnormal blackish color. The presence of copper will betray itself by a bluish coloration on adding the ammonia. Both iron and copper may, however, be rendered harmless by the addition of a drop of a solution of potassium cyanide before adding the ammonium sulphide.

As it is well nigh impossible for a manufacturer to produce an acid absolutely free from lead, the author proposes the following standard of purity: The proportion of lead in either tartaric or citric acid should not exceed 5 parts per million, when tested by the method described.—Jour. Soc. Chem. Ind., 1893, 97.

Lead in Tartrates—Presence of.—F. W. Haussmann finds the tartaric acid of commerce to contain frequently particles of lead. As a rule, however, the tartrates of commerce appear to possess a greater degree of purity than the citrates. The tartrate of lead is considerably less soluble in water than the corresponding citrate.

Potassium Bitartrate.—The cream of tartar of commerce does not appear to be perfectly free from metallic impurities, which is probably due to its method of preparation. Several samples, on being subjected to the pharmacopœial tests, revealed the presence of traces of lead. This is, however, not to the same extent as found in the case of commercial citrates. Other samples again, when subjected to an examination, gave perfectly negative results as to any metallic presence.

Rochelle Salt.—Some ten samples of this salt were subjected to the various tests for lead, none of which gave any indication whatever of its presence. The Rochelle salt of commerce appears to possess a high degree of purity, in the crystalline as well as the powdered state. In connection with this it may be stated that the contents of a number of Seidlitz powders were also examined. While the contents of the white acid papers occasionally showed small particles of metallic lead, in a few cases also giving indication of its presence in solution, those of the blue Rochelle salt papers were found to be free from the same. A similar statement can also be made regarding the Seidlitz mixture of commerce, which, while occasionally varying in composition, is free from any metallic presence.

To determine whether tartrates exerted any action upon metallic lead, a number of particles of the metal were allowed to remain in contact with a 25 per cent. solution of Rochelle salt. This solution was found to be perfectly neutral, as well as free from lead. After a contact of six hours, the solution was examined and revealed an abundance of lead in a soluble form upon the addition of ammonium sulphide solution. On prolonged contact, as the lead passes into solution, the mixture becomes alkaline, changing the color of red litmus as well as turning red with phenolphtalein test solution. This would indicate the liberation of an alkali hydrate.

The same observation was also made with the citrates of lithium and potassium.

Potassium Tartrate.—Of the commercial tartrates examined, this salt was the only one which showed the presence of an appreciable amount of lead in a soluble form. Particles of metallic lead were not found. The three samples examined gave decided reactions for lead.

To summarize, the following statements may be made regarding commercial tartrates: Tartrates prepared directly from the acid are more liable to the presence of lead than when prepared from cream of tartar or similar sources. This has been the writer's experience, while preparing a series of alkali tartrates for comparison with the commercial salts, and for determining the solubility of the lead salt. Cream of tartar apparently possesses a greater degree of purity as regards the presence of metals than tartaric acid. Finally, the citrates appear to be more liable to contain lead than the tartrates. This is readily explained, as the former are usually prepared directly from the acid, while in the case of tartrates, cream of tartar appears to be the source from which they are prepared on the commercial scale.—Amer. Jour. Pharm., 1894, 295.

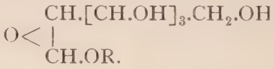
Tartaric and Citric Acids for Lead—Examination of.—M. Buchet. 200 Gm. of the substance is dissolved in 600 C.c. of water, and made feebly alkaline with ammonia. Any insoluble matter is collected, washed, dissolved in nitric acid, and the lead precipitated by sulphuric acid and alcohol. The lead thus found was originally present in the metallic state. The ammoniacal solution is now acidified with hydrochloric acid, and precipitated with hydrogen sulphide solution. The lead sulphide is converted into the sulphate in the same way as above; its amount gives the lead originally present as lead compounds.—Zeitschr. f. Anal. Chem., 1893, 465.

Rotatory Power of Tartrates.—R. Pĕibram makes a table for the rotatory power of the salts of tartaric acid in aqueous solution at 20° C., P being the percentage strength of the solution, in each case corresponding with 3.2 Gm. of tartaric acid in 100 C.c. of water.—Monatsh., 1893, 739; Jour. Chem. Soc. (Abs.), 1894, 229.

Pyruvic Acid.—R. Otto has noticed the occurrence of pyruvic acid in a solution of tartaric acid, which has been kept for some years exposed to light. The solution was dark yellow, and smelled of caramel.—Ber. d. Chem. Ges., 1894, 838.

ALKALOIDS, GLUCOSIDES, ETC.

Glucose and the Glucosides—Constitution of.—L. Marchlewski has previously shown that the constitution of the glucosides may readily be explained by the help of Tollens' or other similar formula for glucose; no evidence was, however, adduced to show with which carbon atoms the oxygen atom present in the "ethylene oxide" is combined. Inasmuch as the glucosides do not behave as aldehydes under any conditions, it is probable that the residue combined with the glucose is united with the carbon atom from which the aldehyde group of the original glucose is produced; and, further, as a second phenylhydrazine residue may be combined with the carbon atom next to the aldehyde group in glucose, but not in the glucosides, it seems probable that the atom complex of this carbon atom has also undergone alteration. From this, the author concludes that the constitution of the glucosides is represented by the formula



$$\mathrm{O}<\begin{matrix}\mathrm{CH.[CH.OH]_3.CH_2.OH}\\ |\\ \mathrm{CH.OR.}\end{matrix}$$

As evidence against the supposition that the radical displaces the hydrogen of one of the alcohol groups, the author adduces the fact that an aqueous solution of sodium glucosate is totally unaffected by phenylhdrazine.—Ber. d. Chem., Ges., 1893, 2928.

Sugar with Mercaptans—Compounds of.—E. Fischer has obtained a number of compounds of certain sugars with various mercaptans, which are termed mercaptals; they differ from the alcohol glucosides (see above) in containing two molecules of mercaptan to one of sugar.—Ber. d. Chem. Ges., 1894, 673.

Estimation of Alkaloids by Hulsebosch's Process.—F. Liennigh rejects the process as being utterly untrustworthy, but suggests a few possible improvements in the apparatus, and also recommends liberating the alkaloids by means of lime instead of by sodium hydroxide.—Chem. Centralb., 1893, 890; from Pharm. Centralh., 1893, 591.

Reactions with Potassium Mercuric Iodide and with Iodine Dissolved in Potassium Iodide.—Tanret reviews the use of these solutions in the determination of alkaloids, and summarizes the work done on this group, and gives a table showing, for 19 alkaloids, the comparative delicacy of the reactions given by Mayer's, Valser's and Bouchardat's solutions. From numerous experiments of his own, he draws the following conclusions: (1) Valser's solution precipitates the non-volatile alkaloids equally well from acid, neutral, or slightly alkaline solutions. (2) The reaction is much more sensitive with the salts of the volatile alkaloids than with the free bases. (3) For some salts of volatile alkaloids—for example, pelletierine sulphate and cicutine hydrobromide—the delicacy of Valser's reagent is much increased by the addition of a little soda. (4) Valser's and Bouchardat's solutions should only be used to test neutral solutions, as many substances other than alkaloids are precipitated in acid solution.

Caffeïne is not precipitated by potassium mercuric iodide from solution in organic acids. In sulphuric acid solution, Mayer's reagent shows the presence of one-fiftieth, Valser's of one-six hundredth, part of alkaloid.

Iodine in potassium iodide detects the presence of 1 part of caffeine in 20,000 parts of a mineral acid solution; with acetic acid, the reagent is useless. Theobromine is not precipitated by potassium mercuric iodide, but gives a black precipitate with Bouchardat's reagent.

Reactions with Glucosides.—No glucoside is precipitated by potassium mercuric iodide from neutral or acetic acid solution. From solution in dilute sulphuric acid, Valser's reagent precipitates vincetoxin, convallamarin, aurantia-marin, digitaleïn, and amorphous digitalin (codex). The combination of glucoside and mercuric iodide is soluble in alcohol: ether dissolves the digitalin compound and decomposes the others.

Reactions with Proteïds, etc.—Albumen gives a precipitate with potassium mercuric iodide in acetic acid solution. This precipitate is insoluble in excess of the reagent in acetic acid, alcohol, ether, or solution of potassium iodide. For the detection of albumen in urine, 5 C.c. of the reagent is taken in a test-tube, and the filtered urine added drop by drop. A bluish disc at the contact surface of the two liquids is observed when the quantity of albumen per litre of urine is 0.01 Gm. or over. In acid solutions, peptones give precipitates which show properties much resembling those of the alkaloid precipitates. Ether causes the disappearance of the precipitate from dilute solutions, more bulky precipitates collect into a sticky mass. In either case the ether decomposes the precipitate, and does not re-deposit the compound on evaporation, as is the case with most of the alkaloid precipitates. Peptones partially prevent the formation of precipitates with alkaloids in neutral solution, rendering the reaction much less delicate. Solutions of 1 part of gelatin in 180,000 react with potassium mercuric iodide in acid solution. The reaction is less sensitive with iodine in potassium iodide. The mercurial precipitate is insoluble in ether, but soluble in alcohol and in hot acidified water. The gelatin precipitate collects together, forming a characteristically elastic mass.

An acetic acid solution of caseïn gives a precipitate with potassium mercuric iodide which is insoluble in excess of the hot reagent, but soluble in alcohol.—Jour. Pharm. Chim., 1893, 433 and 490.

To Detect Albumen, Alkaloids, and Peptones in Solution.—When albumen, alkaloids and peptones are held in a solution, in urine or any other fluid, these substances may easily be detected, according to Fauret by the following procedure: Acidulate the solution with dilute sulphuric acid. Pour in an excess of Valser's reagent, and heat to ebullition. The precipitation due to albumen remains undissolved. Filter while hot, and let cool. Alkaloidal and peptonic precipitates which are hardly soluble in the cold, will re-form. Take 5–6 C.c. of the liquid and agitate it with an equal volume of ether. When the latter has separated out, on standing, decant the fluid and evaporate it on several watch-glasses. The residue is described as the iodohydrargyrate of the alkaloid, impregnated with the red iodide of mercury. The alkaloid is recognized, either by treating the mixture with the minimum quantity of 10 per cent. potassium-iodide solution necessary to dissolve only the mercury biniodide and to leave the white or yellowish iodohydrargyrate behind; or by pouring on the residue a few drops of Bouchardat's reagent, which dissolves the mercury biniodide in part and gives rise to the characteristic precipitate of the alkaloids. This procedure is especially successful with the iodohydrargyrates which (like that of morphine) are dissolved by potassium iodide as fast as mercuric iodide is. Or, by treating the iodohydrargyrate dissolved in potassium iodide with a drop of Bouchardat's reagent, the same precipate will appear. It still remains to detect the peptone, since the peptonic precipitate has redissolved in the aqueous liquor from which the ether has withdrawn part of the mercury biniodide. Add Valser's reagent in excess to the solution, and a precipitate, consisting of peptone, will re-form.

The author calls attention to this property of the peptones of dissolving the iodohydrargyrates of alkaloids in neutral solution and of thus concealing the reaction of the alkaloids. A 15 per cent. peptone solution containing 1 : 4000 of atropine sulphate or 1 : 7000 of strychnine sulphate is no longer precipitated by Valser's reagent; while the limit of reaction for atropine is 1 : 4000, and for strychnine, 1 : 150,000.—Rép. de Pharm., 1894, 104.

Alkaloidal Color Reactions.—The principle of the furfurol test for alkaloids as published by E. Laves has been applied to a number of alkaloids, but as will be noted, the test is especially characteristic of veratrine and in a lesser degree also of sabadilline. The reagent was made by mixing 5 drops of furfurol with 10 C.c. concentrated sulphuric acid; to two or three drops of this brown-colored reagent a minute quantity of the alkaloid is added and stirred with a glass rod. Atropine, aconitine, brucine, colchicin, coniine and nicotine give brown mixtures with no characteristics; strychnine, a dirty brown mixture, upon warming becoming dark green, the addition of a few drops of water changes it to a dirty blue or violet; morphine and codeine, a red-brown color changing to a transient violet-red upon warming; papaverine, brownish, later dirty violet; digitalin, brown, upon warming reddish; quinine, dark brown green, after warming green, later brown, the addition of water then causes a green color especially seen at the edge; veratrine, yellow, olive green, the circumference blue, after a few minutes green and then a beautiful blue; sabadilline, like veratrine, but the colors are not so pure.—N. Wender, Chem. Ztg., 1893, 950.

Estimation of Some Metals and Alkaloids.—In case of a metallic salt this consists in dissolving it in distilled water absolutely free from air, precipitating the metal with hydrogen sulphide and titrating the liberated acid with $\frac{N}{10}$ sodium hydrate after filtering out the metallic sulphide; from the quantity of acid found the weight of the metal is ascertained. In the estimation of alkaloids these must be present either as hydrochlorate or as sulphate: the former salt is precipitated with silver nitrate, the latter with lead nitrate; the precipitates obtained are suspended in water, decomposed by hydrogen sulphide, and the liberated acid, corresponding to the amount of alkaloid, titrated with $\frac{N}{10}$ alkali.—Vitali, in (Bollet. farmac.) Pharm. Post, 1893, 297.

Action of Sodium Phosphate in Presence of Alkaloids.—Christiaens concludes that in order to avoid the precipitation of alkaloids in this combination, it is necessary to neutralize by the addition of phosphoric acid to the preparation, by which the precipitates are completely redissolved. The author states the general rule, that all salts, whose reaction with litmus is alkaline, precipitate alkaloids from their salts.—L'Union pharm., 1893, 521; Amer. Jour. Pharm., 1894, 106.

Determination of Alkaloids by Potassio-mercuric Iodide.—Grandvall and Lajoux (Jour. de Pharm. et de Chem., 1893, 152), propose the following:

100 Gm. of finely powdered plant parts are well triturated with 100 Gm. basic acetate lead, then percolated with 600 Gm. water. The treatment with basic lead acetate has for its purpose the precipitation of the organic acids, while the alkaloids go into solution as acetates; likewise coloring matter extractives and albuminous bodies from insoluble compounds with the lead. The percolate is filtered, treated with slight excess sulphuric acid, the insoluble lead sulphate filtered off, and the alkaloid precipitated by excess of potassio-mercuric iodide, the precipitate is washed and the alkaloid removed by either of the two methods.

1. The precipitate is shaken in separating flask with potassium cyanide, a little solution of caustic soda and ether. The alkaloids may be removed from the ether and purified in the usual way.

2. Add slight excess of solution of sodium sulphide after standing a short time, acidify with sulphuric acid, filter, make alkaline, and shake alkaloids out with ether.

The addition of a little oil (olive) to the ether assists in its rapid separation.

Glucosides of Alcohol.—If gaseous hydrochloric acid be passed into a methyl alcohol solution of glucose, which is kept cold by refrigeration, the mixture, after a short time, loses the power of reducing Fehling's solution and will yield a well-crystallizable product having the formula $C_6H_{11}O_6CH_3$. This reaction is characteristic for all alcohols which dissolve glucose; alcohols which do not dissolve glucose will still give the reaction if the glucose be replaced by acetic chlorhydrose, which is easily soluble in ether, chloroform and benzole and decomposes by the gaseous hydrochloric acid, yielding glucose as one product, which then unites with the alcohol as above. The derivatives of ethyl and methyl alcohol with mannose, galactose, glucoheptose, arabinose, xylose, rhamnose and fructose were obtained;

sugar of milk (lactose) and maltose do not follow the rule because of their aldehydic character. This class of compounds react very much like the natural glucosides; while boiling alkalies, phenylhydrazine and Fehling's solution produce no change, boiling with dilute acids decomposes them into the components. Interesting is the fact that some of these compounds have a sweet and others a bitter taste, and hence the possibility that the so-called vegetable bitter principles may belong to this class. The name proposed for the class is simply to change the ose of the sugar into osid, and precede this term by the name of the alcohol radical, as methyl glucosid, ethyl arabinosid, etc.—Emil Fischer (Berlin Akad. d. Wissensch.) Chem. Repert., 1893, 234.

Localization of Active Principles.—L. Braemer (Comp. Rend., cxvii., 753) has made a micro-chemical examination of the Bryonia dioica, Citrullus colocynthis, and Ecballium elaterium (Cucurbitaceæ), with a view to localizing the bryonin, colocynthin, and elaterin present in their tissues. The color reactions given by these compounds with sulphuric acid (pure or combined with phenol), ammonium molybdate or vanadate, and silver nitrate, were utilized for this purpose. In the case of bryony and colocynth, the material was preserved in ether, in which the respective active principles are insoluble. The reagents were not applied direct, but placed at the edge of the cover glasses over the sections and allowed to penetrate by capillary attraction. In the elements of the tissues containing the active principles, the presence of the latter was clearly indicated by a red coloration, and longitudinal sections made through the different organs of the plants showed that these elements correspond to the sieve tubes described by Fischer as having ceased to exercise their special function and lost their typical structure. In the three species examined, these vessels occupied chiefly the periphery of the liber, but they were also found in the cortical parenchyma, the peric cycle, and the fundamental parenchyma.

Borax and Alkaloids.—Christiaens (L'Union Méd. du Nord-Est) reports that he recently had to prepare a mouth-wash of the following formula:

Cocaine hydrochlorate	20 Cgm.
Distilled water	5 Gm.
Borax	50 Cgm.
Glycerin	2 Gm.

The borax solution in the glycerin, poured into the aqueous cocaine solution, yielded an abundant precipitate, which the author attributed to the alkalinity of the borax. On exact neutralization by dilute hydrochloric acid, the precipitate, which consisted exclusively of cocaine, was re-dissolved. He then treated diverse alkaloidal salts, such as morphine-, quinine-, atropine-, etc., hydrochlorates or sulphates, with borax solution, and always obtained an alkaloidal precipitation immediately and abundantly with quinine, more slowly with morphine; and with the atropine salts only when in concentrated solution. Borax generally behaves like alkalies. Its association with alkaloidal salts should, therefore, be avoided; such mixtures are all the more dangerous, as the precipitation may be slow, as in the case of morphine, and pass unnoticed by the pharmacist. The patient would then be exposed to the danger of absorbing the entire active principle in his last spoonful of the medicine.

ACONITE ALKALOIDS.

Aconite Alkaloids.—W. R. Dunstan and E. F. Harrison (Phar. Jour. and Trans., 1894, 581) recently examined some salts of picraconitine, an amorphous alkaloid obtained by Groves some twenty years ago from the roots of Aconitum napellus, and came to the conclusion that picraconitine is nothing but impure isaconitine, an isomeride of aconitine described by the authors not long ago. Their investigation of this plant has shown the latter to contain, besides aconitine, the non-toxic isaconitine and the hydrolytic product aconine, a minute quantity of an amorphous alkaloid yielding crystalline salts and named homisaconitine, and, generally, a considerable quantity of a base neither crystallizing itself nor yielding crystalline salts. As to the action of heat on aconitine, Dunstan and Carr have found that when the alkaloid is heated at its melting point, 188-190° C. it loses about 10 per cent. of acetic acid, which distils over, leaving behind a new alkaloid, which the authors propose to name pyraconitine. The equation representing this decomposition is:

$$\underset{\text{Aconitine.}}{C_{33}H_{45}NO_{12}} = \underset{\text{Acetic Acid.}}{C_2H_4O_2} + \underset{\text{Pyraconitine.}}{C_{31}H_{41}NO_{10}}$$

Pyraconitine is an amorphous varnish, sparingly soluble in water, but readily dissolved by alcohol, chloroform and ether. It has no action on polarized light, and is not poisonous in small doses. The alkaloid readily dissolves in acids, forming salts, which can be crystallized.

The salts of aconitine also furnish pyraconitine, losing acetic acid when heated to about 190° C. Isaconitine and aconine, however, do not undergo a similar decomposition. The authors have also shown that, while certain aconitine salts are very slowly converted into salts of isaconitine at 100° C. in slightly acid solution, their conversion may be effected very rapidly by heating a neutral aqueous solution in a closed tube at 120–130° C. during 2–3 hours. The isaconitine is separated from this solution and rendered alkaline with ammonia by repeated extraction with ether. The hydrolysis of aconitine into aconine and benzoic acid is invariably followed by the production of isaconitine. A considerable quantity of the latter substance is obtained by adding a large excess of aqueous soda solution to a solution of an aconitine salt, allowing the precipitated alkaloid to stand in the cold in contact with the alkali until some of the alkaloid has dissolved, and extracting with ether.

Aconitine.—M. Freund and P. Beck state that they have made 14 carbon and hydrogen determinations of crystallized aconitine, the results of which, together with other considerations, lead them to adopt the formula $C_{34}H_{47}NO_{11}$, instead of that ascribed to the alkaloid by Dunstan and his pupils, namely, $C_{33}H_{45}NO_{12}$. Ehrenberg and Pürfurst regarded the substance obtained by boiling aconitine with water as a mixture of the benzoates of two bases; the authors have obtained a homogeneous compound by recrystallization. It melts at 202–203° C., and appears to have the formula $C_{39}H_{51}NO_{12}$, being the benzoate of a base, $C_{32}H_{45}NO_{10}$, derived from aconitine. The authors have examined the salts of the last named base, and come to the conclusion that it is identical with Dunstan's "isaconitine;" its properties also render it probable that it is identical with Wright's "picraconitine," for this base. Attempts to prepare aconitine by acetylating picraconitine, have as yet yielded negative results.—Ber. Chem. Ges., 1894, 433.

——— Dunstan replies to Freund and Beck, and states that he and his collaborators have already shown (Pharm. Jour. Trans., 1894, 174, 290, etc.), that aconitine, on hydrolysis, yields acetic acid and "isaconitine," and that the latter is identical with Wright's "picraconitine." He has also proved that isaconitine is benzoyl-aconine, and therefore not isomeric with aconitine.—Ibid., 664.

——— M. Freund and P. Beck continue their work, and give the details of their experimental work.—Ibid., 720.

Action of Iodine on Aconitine.—Dunstan and Jowett find that when iodine acts on aconitine a variable mixture of aconitine hydriodide and periodide, and an amorphous, neutral substance, which is probably iodo-aconitine, is produced. The principal changes may be represented thus:

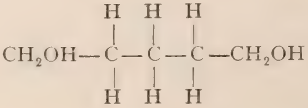
$$(1)\quad 2C_{33}H_{45}NO_{12} - I_2 = C_{33}H_{45}NO_{12}HI - C_{33}H_{44}INO_{12},$$

$$(2)\quad C_{33}H_{45}NO_{12}HI + x\,I_9 = C_{33}H_{45}NO_{12}HI\,x\,I_2.$$

In attempting to isolate iodo-aconitine a substance was obtained which contained much aconitine, and also a smaller quantity of an amorphous gray powder, which melted indefinitely near 208° C., and was nearly insoluble in cold water, but readily dissolved in alcohol and chloroform. The substance did not possess basic properties, and its formula is probably $C_{33}H_{44}INO_{12}$.—Proc. Chem. Soc., 137, 1894, 96.

ADONITE.

Adonite.—E. Fischer confirms the formula formerly proposed by Merck: $C_5H_{12}O_2$.



$$CH_2OH-\overset{\displaystyle H}{\underset{\displaystyle H}{C}}-\overset{\displaystyle H}{\underset{\displaystyle H}{C}}-\overset{\displaystyle H}{\underset{\displaystyle H}{C}}-CH_2OH$$

—Ber. d. Chem. Ges., 1893, 633.

ÆSCORCIN.

Æscorcin.—A derivative of æsculetin, a split-product of the æsculin contained in the rind of the horse-chestnut, is, according to the investigations of Froelich, an excellent means for diagnosing corneal defects and losses of the conjunctival epithelium, since these parts are colored red by 1 drop of a 10 to 20 per cent. solution of æscorcin. This appearance lasts about 10 to 20 minutes. Irritation of the eyes and pain are not produced. The red coloration obtained by æscorcin also stands out far more clearly from the colored background of the iris than does the green tinge of fluorescin, which has hitherto been employed for similar diagnostic purposes.—Drug. Circ., 1894, 105.

ANEMONIN.

Anemonin and its Occurrence.—W. K. J. Schoor. Anemonin occurs in many of the Ranunculaceæ; it is a toxic substance, and produces paralysis of the central nervous system. The compound has the formula $C_{15}H_{12}O_6$, and is deposited in rhombic crystals melting at 152° C. It is volatile with steam, and on exposure to air at ordinary temperatures is slowly converted into anemonic acid; the oxidation proceeds more quickly if platinum black, hydrogen peroxide, or barium peroxide is employed.—Chem. Centralb., 1893, 60; from Maandbl. natuurw., 1893, 23.

BERBERINE.

History of Berberine.—E. Schaer. Zeitschr. z. Erinn. an d. 50-Jahr. Stiftungsfeier d. Schweizer, Apoth.-Ver., Zurich, 1893.—Abstract in Chem. Zeit., 1893, (Rep.), 240.

BELLADONNA ALKALOIDS.

Belladonna—Alkaloids of.—O. Hesse. Merck stated that atropamine was identical with Pesci's apoatropine, he has since shown that the latter alkaloid, like atropamine, may be converted into belladonnine. Apoatropine could not be prepared by following Pesci's directions, but is obtained without secondary products when a solution of atropine sulphate in nitric acid of sp. gr. 1.381 is kept at the ordinary temperature for 24 hours, or when atropine sulphate or hyoscyamine sulphate is dissolved in concentrated sulphuric acid in the cold, and the solution poured into water, or when the last named salts are heated at 85° C. with acetic, benzoic, or phosphoric anhydride, but not when they are treated under any circumstances with hydrochloric acid. The base is difficult to obtain in a crystalline condition, and the author now confirms Merck's observations that it is identical with atropamine.

Belladonnine is obtained when a solution of atropine or of hyoscyamine in concentrated sulphuric acid is allowed to remain for a short time. The platinochloride melts at 229° C., and the aurochloride at 120° C. If hyoscyamine is slowly raised to a temperature of 120–130° C. it is first converted into atropine, thence into apoatropine, and finally into belladonnine. When apoatropine is treated with alkalies or with hydrochloric acid, it is converted either into belladonnine or decomposition products of the latter, or undergoes more advanced decomposition; the reason, therefore, that both Perci and Merck obtained tropine from apoatropine was, that they subjected the alkaloid to too violent treatment with alkalies and thus precluded the formation of belladonnine.

When apoatropine is heated in a sealed tube with fuming hydrochloric acid (8 parts) for eight hours at 85–100° C., belladonnine and tropine are formed; if, however, the solution is heated for 16 hours at 140° C., bellatropine is obtained. The platinochloride, $C_8H_{15}NO_2,H_2PtCl_6$, melts at 212° C., and the aurochloride at 163° C. The base crystallizes in colorless prisms.—Ann. der Chem., 1893, 290.

Atropine and Atropine Sulphates in the U. S. P.—J. C. Umney criticises the M. P. given and other tests.—Amer. Drug. and Pharm. Rec., June, 1894.

——— R. G. Eccles replies conclusively to the same.—Ibid., 301.

Constitution of Atropine.—A. R. L. Dohme. A study in the synthesis of alkaloids.—West. Drug., 1893, 283.

The Detection of Atropine.—In a paper on observations of the toxicological research for atropine, Fabris comes to the following conclusions: Strychnine in the presence of atropine marks the reactions of this latter, unless the proportion of atropine to strychnine be very large. When the quantities of these two alkaloids present together is very small, chemical evidence will give a negative result, whereas physiological tests will show the presence of both. Thus the necessity of a physiological test is shown again clearly.—Bulletin de la Société Royale de Pharmacie; Brit. and Col. Drug., 1894, 527.

Hyoscine Hydrobromate.—Gordon Sharp has studied the clinical effects of this compound, working with a sample of undoubted purity, and finds that they differ little from those of atropine. He considers, however, that until more is known of the chemistry, pharmacology and clinical effects of hyoscine, it can hardly be recommended as a safe hypnotic.—Pharm. Jour. Trans., 1894, 621; from Practitioner, 52, 22.

Hyoscine.—O. Hesse brings forward fresh evidence in support of the following views: Ladenburg's hyoscine is identical with scopolamine; it has the composition represented by the formula $C_{17}H_{21}NO_4$, and on decomposition at 60–100° C. yields oscine, $C_8H_{13}NO_2$, which is identical with scopoline. Scopolamine (hyoscine) hydrobromide is therefore not a new mydriatic.—Ann. der Chem., 1893, 304.

Hyoscine and Oscine.—O. Hesse.—The aurochloride obtained from commercial hyoscine hydriodide has the composition $C_{17}H_{21}NO_4,HAuCl_4$, and melts at 198° C. As thus prepared it appears to contain a trace of an unknown alkaloid, which does not, however, alter its composition.

The formula of benzoyloscine was erroneously given as $C_{15}H_{17}NO_4$; it should be $C_{15}H_{17}NO_3$. The formula of oscine aurochloride requires similar alteration. When benzoyloscine is warmed with hydrochloric acid, it decomposes into oscine and benzoic acid.—Ann. der Chem., 1893, 84.

Tropeïnes—Some New.—A. Petit and M. Polonovsky.—A substitution of alkyl salts for the corresponding acids in the preparation of tropeïnes by Ladenburg's method.—Jour. Pharm. Chim., 1893, 529.

Theobromine and Caffeïne—Separation of.—H. Brunner and H. Leins. Süss extracts the raw material with light petroleum to remove caffeïne and fatty matter, and then with chloroform to dissolve the theobromine. The authors found, however, that the alkaloid obtained in this way is not pure, but reduces an ammoniacal solution of silver nitrate, whilst the pure substance yields a white compound of the formula $C_7H_7AgN_4O_2$.

When pure theobromine may be separated from caffeîne by means of silver nitrate. About 0.2 or 0.5 Gm. of the mixed alkaloids is dissolved in 200 C.c. of water, mixed with 5 C.c. of ammonia and boiled with 0.6 Gm. of silver nitrate until the ammonia is expelled. The liquid is cooled to 30° C., the precipitate collected and washed with water at 30°, and then dried at 110° C.—Chem. Centralb., 1892, 802; from Schweiz. Woch. Pharm., 1893, 85.

New Reactions for Caffeine and Theobromine.—Tanret proposes to employ the double iodide of potassium and mercury, and iodine in iodide of potassium solution, as reagents for distinguishing these bodies. The former of these is under many names, and the varieties possess slightly different compositions. The one most suitable for the detection of caffeine is Valser's reagent, containing 14.73 Gm. of HgI_2, and 10 Gm. of KI to 100 C.c. of water. Some remarkable differences of opinion exist as to the reaction taking place, for Delf urged that the precipitate rapidly becomes crystalline, whereas that of the alkaloids is amorphous. Valser and Dragendorf actually hold that caffeine is not precipitated by the reagent at all. The difference is probably due to the fact that these chemists work with different solutions, etc., and with different degrees of acidity, etc. Tanret states that by acidifying with H_2SO_4 (1 in 10), the precipitate observed by Delf is obtained. This reaction is only sensitive when the solution contains at least 0.15 per cent. of caffeine. Theobromine gives no precipitate with Valser's reagent. The other reagent, iodine in KI, so long as it contains excess of KI (1 Gm. of I, 1 Gm. of KI, and 50 C.c. of H_2O), gives a precipitate with caffeine, the color of kermes mineral, in solutions as dilute as 1 in 20,000. With theobromine the precipitate is black, and the reaction is sensitive as far as 1 in 10,000.—Rép. de Pharm., 1894.

Caffearine.—A new alkaloid was isolated from coffee by P. Palladine by repeatedly boiling the raw coffee (in as fine a condition as possible) with ten times its weight of water, to which a little milk of lime was added; the decoctions are precipitated with solution of lead subacetate in slight excess, filtered, the excess of lead removed by adding sulphuric acid, and the solution concentrated; should the solution show considerable color, the precipitation with lead subacetate is to be repeated; the caffeine is removed by extracting with 10–12 portions of chloroform, or until nothing more is removable. The solution is acidified with sulphuric acid and evaporated several times to volatilize the acetic acid, after which the aqueous solution is decolorized by animal charcoal; the caffearine is next precipitated by potassio-bismuth iodide, the precipitate carefully washed, suspended in water, and decomposed with hydrogen sulphide, the hydriodic acid neutralized with lead carbonate, filtered, and the precipitation with potassio-bismuth iodide, etc., repeated until the precipitate shows a beautiful crystalline appearance; after decomposing with hydrogen sulphide, the solution of the hydroiodate is warmed in a water-bath with silver oxide, carefully neutralized with hydrochloric acid, and the hydrochlorate allowed to crystallize. The alkaloid itself $C_{14}H_{16}N_2O_4$ can be obtained from the hydrochlorate by the use of silver oxide, and is obtainable in crystalline needles which are acted upon by light, and are quite soluble in water and alcohol. The hydrochlorate $C_{14}H_{16}N_2O_4HCl + H_2O$ forms needles extremely soluble in water, also soluble in dilute alcohol, but insoluble in absolute alcohol. Caffearine differs from caffeine by being precipitable by alkaloidal reagents.—Apoth. Ztg., 1893, 443.

Cause of Variation in Estimations of Caffeine.—A. Hilger has found (Pharm. Zeit., 1894) that both kola and cacao contain a glucoside and a diastatic ferment. In the kola nut this glucoside splits up, either under the influence of the ferment in the presence of heat or under the action of 10 to 20 per cent. sulphuric acid, into caffeine, dextrose and kola red. The glucoside from the cacao yields theobromine, dextrose and cacao red. From this it will be seen that to obtain a uniform yield of caffeine it is essential that the glucoside be completely split up before the estimation is made.

Caffeine Preparations—Effervescent.—L. Ough describes the results of analyses of a number of samples which show evidence of a remarkable variation in the amount of caffeine they contain. In some instances they contained little more than half as much as the preparations were stated to contain, while in others it was from two to three times as much. He calls attention to a sample of effervescent citrate of caffeine sweetened with saccharin instead of sugar, and which appears in many instances to have a distinct advantage over the ordinary kind.—Pharm. Jour. Trans., 1893, 193.

Citrate of Caffeine.—Soucheire (Rep. de Pharm., 1893, 206) claims that this salt does not exist in aqueous solution. He prepared the salt by dissolving 1.80 Gm. caffeine in 30 C.c. pure chloroform, and 1.80 Gm. citric acid in 15 C.c. absolute alcohol, mixing the two solutions and evaporating on a water-bath; the product was a white crystalline powder, insoluble in chloroform, but soluble in two parts of chloroform and one part alcohol. The solution of the salt in water was evaporated on a water-bath, and the residue treated with chloroform, which took up caffeine and left citric acid as a residue, proving that the water had split up the caffeine citrate into a simple mixture of caffeine and citric acid.

Caffeine Oxalate.—Formula $C_8H_{10}N_4O_2.C_2H_4O_2$, and occurs as a white crystalline powder, soluble in water and in alcohol.

Caffeine Sulphonates.—Recommended by Heinz and Liebrecht as unobjectionable and safe diuretics, especially in the treatment of dropsy. The sodium salt has been called by the name nasrol; recently the manufacturing firm have placed upon the market the sodium salt under the name of Symphorol N; the lithium salt is called Symphorol L, the strontium salt Symphorol S.—Pharm. Ztg., 1893, 704.

Iodocaffeine, *Iodotheine*, *Iodotheobromine.*—See New Remedies.

HYDRASTIS CANADENSIS ALKALOIDS.

Canadine.—A third alkaloid from Hydrastis canadensis, was first mentioned by A. K. Hale. His work was confirmed and supplemented by Prescott and by J. C. Burt, who prepared its sulphate and hydrochloride. H. Lerchen some time thereafter termed this alkaloid Xanthopucin. The above-mentioned investigators did not prepare this alkaloid in chemically pure conditions, but the alkaloid isolated in small quantity by Wilhelm (1891), and termed Canadine, is probably identical with it. Canadine was recently prepared in larger quantities; its composition and properties were further investigated and its salts prepared. The process was the following: The rhizomes were exhausted with water acidulated with acetic acid, the solution concentrated by evaporation and ammonia added to precipitate the hydrastine. The crude hydrastine thus obtained was washed with water, treated with dilute sulphuric acid and the solution filtered. After the addition of nitric acid to the filtrate it was set aside for 1 or 2 days. The precipitate was dissolved in hot water, and the base precipitated by the addition of ammonia. The base was again dissolved in dilute sulphuric acid, nitric acid added, and set aside as before. This operation was repeated until the nitrate had a white color (with but a shade of yellow). The base was precipitated from the hot aqueous solution of the nitrate by ammonia, and further purified by recrystallization from benzin and then from alcohol. The resultant was an apparently pure alkaloid, melting at 132° to 133° C., but on combustion gave results very much different from those obtained by Deichman in 1892. It was, therefore, further purified by dissolving in dilute sulphuric acid, and the solution allowed to evaporate spontaneously, when large, colorless, tabular crystals were obtained. The sulphate was re-crystallized from water, and the alkaloid prepared from it crystallized from alcohol.

The alkaloid thus purified forms white shining needles, which melt at 132.5° C. When exposed to the light it gradually acquires a yellow color. It is insoluble in water, quite readily soluble in alcohol, especially on warming, but less soluble in benzin. It is quite readily soluble in ether, chloroform and benzene (benzol). The inorganic acid salts of canadine (with the exception of the sulphate) are sparingly soluble in water, especially if an excess of acid is present. An alcoholic solution of canadine is neutral to litmus and phenolphtalein, and is strongly laevo-rotatory; the aqueous solutions of its salts having the same optic properties. On analysis canadine, purified as above stated, gave results corresponding to the formula $C_{20}H_{21}NO_4$. Canadine sulphate, $C_{20}H_{21}NO_4.H_2SO_4$, forms large, colorless crystals. Chemically, canadine is regarded as a tetra-hydro-berberine.—E. Schmidt, in Archiv. Pharm., 1894, 136.

CARPAINE.

Carpaine.—An alkaloid obtained from the leaves of Carica papaya, occurs in the form of colorless, shining prisms, belonging to the monoclinic system. Its taste is intensely bitter; according to Greshoff it is perceptible in a 1 to 100,000 dilution. It is insoluble in water, but readily soluble in chloroform, alcohol and similar solvents. Its alcoholic solution changes the color of litmus to blue, but is indifferent towards phenolphtalein. It melts at 121° C. According to Oefele, carpaine is the only digitalis substitute (excepting those belonging to the caffeine group), that can be injected subcutaneously without causing irritation or an abscess. Internally in doses up to 0.025 Gm. per day it has no advantage over digitalis. On the other hand, if applied subcutaneously in doses of from 6 Mgm. to 1 Cgm. per day, or every two days, it is recommended. Its effects are noticeable in a few minutes. Greshoff estimates the yield of alkaloid from the leaves of a cultivated tree at 30 Gm. annually.—Pharm. Centralh., 1894, 85.

CHIONANTHUS VIRGINICA.

Chionanthin.—A glucoside from Chionanthus virginica, was isolated by extracting the root with hot petroleum ether; after distilling off the solvent the residue separated white, partly crystalline, partly amorphous crusts, which, after washing with cold alcohol were dissolved in boiling alcohol, when upon the cooling of the solution the glucoside separated. It is only slightly soluble in cold water and alcohol, but is soluble in hot water and hot alcohol; it has the formula $C_{22}H_{28}O_{10} + 2H_2O$, becomes anhydrous at 110° C. and at higher temperature is colored red-violet, and melts, forming a transparent, glassy mass; dilute acids yield dextrose, and a red-brown resinous substance, soluble in ether and alcohol; this decomposition is attended by a strong odor, recalling balsam of Peru. A preliminary examination of the bark gave indications of alkaloids with Mayer's reagent and potassium tri-iodide; the aqueous decoction with lead subacetate gave a copious precipitate which, after washing with water and alcohol was decomposed by hydrogen sulphide; after filtering and evaporating a yellowish powder was obtained, soluble in hot water, but precipitating again upon cooling, this aqueous solution gave the alkaloidal indications; it is soluble in alkalies and alkaline carbonates. Saponin was tested for, but without confirmatory results.—W. von Schulz, Pharm. Zeitsch. f. Russl., 1893, 579 and 593; Amer. Jour. Pharm., 1894, 34.

CHITENINE.

Chitenine.—R. Bucher. When chitenine, the oxidation product of quinine, is heated for two hours with 2½ times its weight of benzoyl chloride, the benzoyl derivative, $C_{19}H_{21}N_2O_4Bz$, is obtained. Chitenol, $C_{18}H_{20}N_2O_4 + H_2O$, is obtained on heating chitenine with 10 times its weight of colorless hydriodic acid for three hours at 100° C.—Monatsch., 1893, 598; Jour. Chem. Soc. (Abs.), 1894, 152.

CINCHONA ALKALOIDS.

New Granada Cinchona Barks.—N. Howard has obtained the following results from the following:

Name of Barks.	Quinine.	Cinchonidine.	Cinchonine.	Quinidine.	Amorphous.
Thomsoniana	4.45	0.27	0.82	0.26	0.74
Ledgeriana	3.68	0.00	0.01	0.20	0.44
Negra	5.48	0.00	0.10	trace	0.78
Morada	2.30	0.00	0.04	0.50	0.38
Juna	6.78	0.40	0.38	0.18	0.42
Pombiana	4.41	0.34	0.02	trace	0.26
Officinalis	4.74	1.23	0.10	0.07	0.42
Succirubra	4.45	2.77	0.12	0.02	0.36
Bastard B.	2.49	1.92	0.04	trace	0.52

—Ann. de Chim. e di Farmakol., 1893, xviii., 101; Répert. Pharm., 1893, xliv., 466; Chem. Zeit., 1893 (Rep.), 297.

Homologues of Quinine—Their Physiological and Therapeutic Action.—E. Grimaux, assisted by MM. Laborde and Bourru, find that cupreine, the base obtained from quina cuprea, is a substance of a mixed function, an alkaloid quinine. He has obtained the following (action increases as they ascend the) series:

$C_{19}H_{21}N_2O,OH$, cupreine.

$C_{19}H_{21}N_2O,OCH_3$, methyl cupreine (quinine).

$C_{19}H_{21}N_2O,O_2CH_5$, ethyl-cupreine (quinthyline).

$C_{19}H_{21}N_2O,O_3CH_7$, propyl-cupreine (quinopropyline).

$C_{19}H_{21}N_2O,OC_5H_{11}$, amyl-cupreine (quinamyline).

Ethyl-cupreine, as an anti-periodic, is found much superior to quinine.—Compt. Rend., cxviii., 1303.

Cinchonine—New Isomer of.—Jungfleisch and Léger (Compt. rend., cxviii., 1894, 29) describe a new isomer of cinchonine, which they name cinchonine δ. It is obtained by continued boiling of alcoholic solution of dibromhydrate of hydrobromo-cinchonine and subsequent separation from the other bases present. When slowly crystallized from ether it forms long prisms, which are insoluble in water, but freely soluble in alcohol, benzol, chloroform, or acetone. The base melts at 150° C., and is dextrogyre; its rotatory power, measured at 17°, being $a_D = + 125.2°$. It forms a hydrochlorate and hydrobromate, which each occur as small prisms, and contain 1.5 and 2 molecules of water respectively; and an oxalate containing five molecules of water of crystallization, which forms fine needles. Solutions of cinchonine δ or of its salts become colored rapidly on exposure to air and light, the brown-colored products of the change being much less alkaline than the base itself.

Cinchonifine.—E. Jungfleisch and E. Léger (Compt. rend., 1894, 536). Cinchonifine ranks among the alkaloids insoluble in ether, and also insoluble in alcohol of 50 per cent. It crystallizes out of boiling alcohol in small, anhydrous needles, brilliant and colorless. It is insoluble in water, ether and dilute alcohol, very slightly soluble in the cold in alcohol and chloroform, but soluble in alcoholized chloroform. Melting point, 273.6° C. If strongly heated it is volatilized with decomposition. It is dextrorotatory. Cinchonifine renders tincture of litmus blue, but does not redden phenolphthalein. The alkylic derivatives of cinchonifine crystallize distinctly. Details of a large number of salts are given. Hesse, after having contested the existence of cinchonifine, has recently described, under the name of homocinchonine, a base which presents great analogies with cinchonifine, and is obtained in a similar manner.

Pseudocinchonine.—E. Lippmann and F. Fleissner. When cinchonine trihydriodide is heated with water (½ to ¾ vol.), for 5 to 6 hours at 150–160° C., it gradually dissolves, and on keeping the solution, a yellow acicular precipitate gradually falls, consisting of the hydriodide of pseudocinchonine, a base isomeric with cinchonine.—Monatsh., 1893, 371; Jour. Chem. Soc. (Abs.), 1894, 152.

Cinchonine.—O. Hesse has studied the action of sulphuric and hydrochloric acids on cinchonine, and has obtained 10 of the 16 theoretically possible isomerides.—Ann. der Chem., 1893, 88.

Allocinchonine.—E. Lippmann and F. Fleissner. The base recently obtained by the author from hydriodo-cinchonine dihydriodide, and denominated by them pseudocinchonine, differs from a base described in the meantime by Hesse under the same name; they therefore propose to call their base allocinchonine.—Ber. d. Chem. Ges., 1893, 2005.

Benzoylcinchonine.—Prepared by E. Léger by the following process which is a modification of Schützenberger's process, published in 1858: 50 Gm. of precipitated and dried cinchonine are introduced into a vial with 30 Gm. benzoyl chloride; close the vial and heat on a water-bath for an hour; when the reaction is finished, take up the viscous product with water; add to this solution an excess of NH_3 and agitate with ether. The ethereal solution is washed with water, concentrated by distillation, and allowed to rest for a day. Now decant the ethereal solution of benzoylcinchonine, evaporate, and place the viscous product under a bell-glass over sulphuric acid. When it has completely solidified, pulverize it, redissolve in ether, filter and concentrate the solution, when, after twenty-four hours, the benzoylcinchonine will crystallize out. It is insoluble in water, but forms syrupy solutions with alcohol and ether, from which it does not again crystallize; it is much less soluble in absolute ether. It combines with acids to form basic and neutral salts. Benzoylcinchonine is feebly lævogyre, and the rotary power of its acid solutions is inferior to that possessed by the alcoholic solutions, and diminishes as the quantity of acid is increased. The author has likewise prepared and studied a number of salts of this base.—Jour. Pharm. Chim., 1893, 405.

Halogenalkyl Derivative of Quinic Acid and Some of its Derivatives.—F. Stohr, in Pharm. Post, 1894, 14.

Transformation of Quinine.—J. H. Skraup. This paper contains a detailed account of former researches, and some additional facts regarding quinine and nichine compounds.—Monatsh., 1893, 428; Jour. Chem. Soc. (Abs.), 1893, 737.

Easily Soluble Quinine Double Salts.—These can be made by either dissolving quinine sulphate in diluted hydrochloric acid, and evaporating in vacuo, or by passing hydrochloric acid gas over quinine sulphate previously dried at 100° C., displacing the excess of acid vapors by a current of air, and finally drying in vacuo in the presence of potash. The salt has the formula $(C_{20}H_{24}N_2O_2)_2 2HClH_2SO_4+3H_2O$. It crystallizes in needle-shaped masses, loses its water of crystallization between 100° and 108° C., is very easily soluble, the anhydrous salt dissolving in an equal weight of cold water. Instead of quinine sulphate the alkaloid with the proper quantities of hydrochloric and sulphuric acids may be used. The corresponding double salt containing hydrobromate with sulphate has an analogous formula, but is not so soluble, the anhydrous salt dissolving in about three parts of water.—Südd. Apoth. Ztg., 1893, 339; Amer. Jour. Pharm., 1893, 492.

Quinine Sulphate—Soluble in Water.—The inconvenience and possible objection to adding sulphuric acid to quinine sulphate, for use in some aqueous solution, induced E. Crouzel to look for some substitute for this acid. He chose tartaric and citric acids, which are already used for preparing solutions of mercuric chloride for subcutaneous injection. These acids agree better with the digestive fluids; they are besides habitually ingested in the form of fermented beverages (wine, cider). They thus constitute eligible solvents of quinine salts, and even of most other alkaloids that are but little or not at all soluble in neutral liquids; and they will be of special advantage, it is maintained, in hypodermic injections, owing to their very feeble action on the constituents of the blood. The proportions necessary to render 0.5 Gm. of quinine sulphate soluble in 60 Gm. of distilled water, are: tartaric acid, 10 Cgm.; citric acid, 30 Cgm.—L'Union Pharm., 1894, 177.

Quinine Salts and Asaprol.—E. Ismail (Rep. de Pharm., 1893, 487) says that when a solution of a basic or neutral quinine salt (the sulphate or the hydrochlorate) is poured at once into a solution of asaprol, a resinous body appears on the surface of the liquid, which is insoluble in water and soluble in 90 per cent. alcohol. If an asaprol solution is gradually added to a solution of a quinine salt, a white precipitate is deposited in the bottom of the tube, and becomes soft and grayish.

Cinchona Alkaloids.—Grave gives the following modification of De Vrij's method for detecting cinchonidine salts in those of quinine. One Gm. of the sulphate of quinine is dissolved, with the aid of heat, in 40 C.c. of distilled water; to the warm solution 6 C.c. of solution of potassium chromate (5 parts K_2CrO_4 in 95 of water) are added. Most of the quinine is thus precipitated, and to insure complete precipitation the mixture is allowed to stand for a night at a temperature not exceeding 15° C. It is now filtered through powdered glass, and to the solution is added nine or ten drops of a 5 per cent. solution of sodium acetate. If the quinine salt is pure the solution will remain quite clear for several days. If cinchonidine be present the liquid becomes turbid, according to the quantity present. This reaction is quantitative, and the cinchonidine may be collected and weighed.—Jour. de Phar. d'Anvers, 1893.

Quinine Historically.—G. E. Barksdale, in Merck's Mark. Rep., 1894, 34, gives a general summary.

Quinine Output in India.—Brit. and Col. Drug., 1893, 517.

Quinine Tannate.—De Vrij gives the following method for obtaining a preparation containing the highest possible percentage of quinine: 43 parts pure quinine and 57 parts of tannic acid are mixed in a porcelain mortar, 100 parts of 95 per cent. alcohol added, the mixture is kneaded and the resulting mass is allowed to dry for a few days at the ordinary temperature. It is then spread out, and when entirely dry it is reduced to a powder. It forms a white powder, having a faint yellowish shade, and is tasteless.—Pharm. Centralh., 1894, 155.

Quinine and Uranium Chloride.—A yellow crystalline powder, soluble in water.—Merck's Bericht, 1893.

Ethiodides of the Cinchona Alkaloids—New Isomerides of the.—J. H.

Skraup and F. K. Norwall. By heating the so-called neutral hydriodides of cinchonine, cinchonidine, and quinine with ethylic iodide, crystalline yellow compounds are obtained.—Ber. d. Chem. Ges., 1893, 1968.

COCA ALKALOIDS.

Cocaine Salts in aqueous solution are precipitated by borax, the precipitate dissolving upon the addition of glycerin. The explanation is that the alkaline borax precipitates the cocaine which is dissolved again when the added glycerin liberates boric acid from the borax. If the solution containing glycerin borax and some cocaine salt be warmed, a turbidity is noticeable, commencing at the top of the solution and traveling downward throughout the entire solution; during cooling the solution becomes perfectly clear again. No explanation is given for this peculiar behavior which results with solutions containing 0.1 per cent. of cocaine hydrochlorate.—M. Lewy, Pharm. Ztg., 1893, 602.

Cocaine Reaction.—To 0.02 Gm. cocaine hydrochlorate dissolved in one drop of water is added 1 C.c. concentrated sulphuric acid; the colorless solution upon addition of a drop of potassium chromate or dichromate solution gives a precipitate which rapidly redissolves; upon moderate heating the yellowish red color changes to green, while stronger heating causes the escape of benzoic acid vapors. Other reducing alkaloids like morphine are distinguishable by other tests, as, for example, the action of sodium hydrate, which dissolves morphine but not cocaine.—Schaerges (Schwz. Wochenschr. f. Chem. und Pharm.), Pharm. Ztg., 1893, 602.

Cocaine Hydrochloride—Melting Point of.—O. Hesse. When cocaine hydrochloride is heated at 160–161° C. in a Roth's apparatus, it sinters at the end of 15 minutes, swells up after 25 minutes, and is completely fused in 31 minutes; these changes take place, although more slowly, even at as low a temperature as 151–154° C.—Ann. der Chem., 1893, 308.

——— Kinzel expresses the opinion that a well purified cocaine hydrochloride should have a M. P. from 201° to 202° C.—Pharm. Centralh., xiv., 38.

——— Hesse points out that according to the observations of Antrick, Einhorn and Marquardt, the M. P. of pure cocaine hydrochloride was found to be 181.5° C., and that he has not found it to exceed 186° C. The presence of cocaine hydrochloride tends to lower the M. P. From correspondence with other observers who have arrived at the conclusion that the M. P. of cocaine hydrochloride is above 200°, Hesse has ascertained that they have determined the M. P. in a bath of sulphuric acid, and he attributes to that circumstance the higher results observed. In snpport of this opinion Hesse refers to the M. P. assigned by E. Schmidt (Apoth. Zeit., 1890, 186) to the gold salt of Bender's alkaloid, which was 16 degrees higher than that observed by himself, a difference as great as that between the temperatures given as the M. P. of cocaine hydrochloride. Hesse uses Roth's apparatus for taking M. P.—Ann. der Chem., 1893, 342.

Cocaine Hydrochlorate.—J. M. Francis (Bull. Pharm., 1893, 541) is of opinion that the published variations in the melting-point of cocaine hydrochlorate are due, in many cases, to difference in the degree of heat applied, or the length of time during which the alkaloid is subject to its action. He has never been able, by any means of purification, to obtain a sample of this salt, which had a melting-point as high as 200° C. under any circumstances. The U. S. Pharmacopœia fixes the melting-point at 193° C., but this is exceedingly difficult to obtain. For instance, the following figures were obtained with two samples of great purity, the conditions of experiments being in all cases the same:

C.			D.		
No.	Time: Minutes.	Melting-point.	No.	Time: Minutes.	Melting-point.
1	22	191° C.	1	15	192° C.
2	28	184° C.	2	28	184° C.
3	33	182° C.	3	34	182° C.
4	37	180° C.	4	37	178° C.
5	47	178° C.	5	40	176° C.
6	53	177° C.	6	48	174° C.
7	60	176° C.	7	53	171° C.
			8	60	169° C.

From these results Mr. Francis concludes that cocaine hydrochlorate is easily decomposable by heat, and that this decomposition sets in before the melting-temperature is reached, and that therefore this salt does not have a melting-point, but rather a decomposition-point, which varies greatly, according to conditions.

Cocaine and Pilocarpine Salts with Calomel.—Schell first observed that when cocaine hydrochlorate and calomel were mixed in the presence of water the mixture turned black. Lenz observed that this reaction was even stronger with pilocarpine salts than with salts of cocaine, and attributed the coloration to the presence of mercurous oxide. A. Schneider, however, is of opinion (Pharm. Centralh., 1893, p. 519) that the reaction consists in the formation of a double salt of the respective salts with mercuric chloride, and that the separated body is metallic mercury, not mercurous oxide.

Cocaine Lactate ($C_{17}H_{21}NO_4C_3H_6O_4$).—A new salt of cocaine, described by Wittzack, Merck's Bericht, 1893, as a white, thick, honey-like mass, easily soluble in water. It has been employed by the author, with highly satisfactory results, to avoid the increased sensitiveness of the bladder in the local treatment of tuberculous cystitis with lactic acid. 1 Gm. of the following solution is to be instilled once or twice a week:

Cocaine Lactate	1 part.
Lactic Acid	of each, 5 parts.
Distilled Water	

The bladder should be emptied before the application, but not irrigated.

Cocaine Phenylate.—Three formulas have been proposed for this substance, to which v. Oefele again calls attention. (1) The preparation proposed by Viau was a mixture of cocaine hydrochlorate and phenol; phenol being more soluble in solutions of cocaine hydrochlorate than in water, suggested the above preparation. (2) Oefele proposed the fusion of molecular proportions of cocaine and phenol, or about three parts of cocaine and one part phenol; this preparation differs from that of (1) by being almost insoluble in water. (3) Poinsot introduces under the same title a mixture of one part phenol, two parts cocaine, forty parts vaseline oil, and 20 parts of arachis oil, which are fused together and put upon the market in tubes.—V. Oefele, Pharm. Centralhalle, 1893, 706.

Tropacocaine.—G. Ferdinands, writing of its use in ophthalmic surgery (Brit. Med. Jour., 1318), says it is more reliable and deeper in its action than cocaine, and the anæsthesia it produces lasts a little longer. Unlike cocaine, it anæsthetizes inflamed tissues—at least, more deeply. The strength of the solution depends on the requirement. For general use 2 or 3 per cent. is sufficient, and a 5 per cent. solution may be used with safety when anæsthesia of the deep-seated parts is required. Solutions of the hydrochlorate made with distilled water keep well and retain their strength for months. The use of the solution gives rise to no disagreeable symptoms, and the alkaloid practically has no mydriatic action; neither is it hæmostatic.

Nor-Rechts Ecgonine.—A. Einhorn and A. Friedlænder. In this paper, the constitutional formulæ adopted are based on those proposed by Merlin.—Ber. d. Chem. Ges., 26, 1482–1491.

Tropine—Formula of.—J. F. Eykman. By comparison of the molecular refraction of tropine and pseudotropine with that of certain substances of, in some respects, similar constitution, the conclusion is drawn that these two compounds do not, as Ladenburg thinks, contain a double bond.—Ber. d. Chem. Ges., 26, 1400–1403.

CONIINE.

Coniine.—J. Schorm observes that the first distillate in the preparation of coniine effervesces when acidified, and oily drops separate, which soon resinify. By redistillation without acidifying, the carbonate of the base loses carbonic acid and distils over as hydrate; this can be neutralized with hydrochloric acid, evaporated, heated until free from odor, dissolved in water, decolorized if necessary, and freed from the last traces of impurity by peroxide of hydrogen, which does not attack the coniine salt present. By crystallization large colorless crystals of coniine hydrochlorate can be obtained; the mother-liquor contains the hydrochlorate of conhydrine and a third base. The latter two can be separated by shaking an alkaline solution with ether, which removes conhydrine, but not the third base. Hydrate of coniine is preferable to coniine as a starting point for the manufacture of the salts of coniine. Treatment with peroxide of hydrogen is adapted for the purification of nicotine solutions also.—Zeit. angew. Chem., through Chem. Repert., xviii., 127.

Isoconiine.—A. Ladenburg.—Attempts to split hydroquinoline, a substance containing "asymmetric nitrogen," but not asymmetric carbon, into optically active modifications by fractional crystallization of the tartrate, have proved unsuccessful. This is a strong argument against the "asymmetric nitrogen" hypothesis, a point which Simon, in a critical abstract of the former paper, has contested.—Bull. Soc. Chim., 1893, 801; Jour. Chim. Soc. (Abs.), 1894, 213.

Coniine and Nicotine.—G. Heut. These may be distinguished by adding phenolphthalein and chloroform to their aqueous solution and shaking vigorously; in the case of nicotine, the color then disappears at once; with coniine, it is permanent. To estimate coniine and nicotine in the presence of each other, dissolve in a small quantity of water, with addition of alcohol; to 50 C.c. of the solution add 5 drops of chloroform and 1 drop of strong solution of phenolphthalein, and titrate with $\frac{N}{10}$ sulphuric acid until, on shaking vigorously, the color disappears; this gives the coniine. To determine the nicotine, now add litmus, and continue the titration with acid. (The color reaction with litmus is not affected by chloroform.)—Arch. Pharm., 1893, 376.

Homoconiine.—According to F. Jacobi and C. Stöhr (Ber. d. Chem. Ges., 1893, No. 26), coniine, $C_9H_{19}N$, is capable of forming nine isomeric methyl-derivatives, according as the methyl-group enters, in place of a hydrogen-atom, either into the pyridine nucleus or into the lateral chain. Eight of them must be secondary bases, like coniine itself; while the ninth —coniine with its nitrogen-atom replaced by a methyl molecule—is a tertiary base. Only the last-mentioned coniine-derivative has hitherto been known, and, from its nature, cannot be regarded as one of the homologues proper of the hemlock-alkaloid. The authors obtained a real homologue—homoconiine—from alpha-isobutylenepyridine ($C_9H_{11}N$), by treatment in alcoholic solution with metallic sodium (nascent hydrogen). The pure base is a colorless fluid, clear as water, and of an odor identical with that of natural coniine, behaving, besides, just like coniine as regards solubility in cold and warm water; its boiling point, however, is much higher—181–182° C. Homoconiine dissolves easily in alcohol and ether. Its hydrochlorate—$C_9H_{19}N.HCl$—crystallizes in delicate, colorless needles. Pharmacological and therapeutical data are yet wanting.

Pure d-Coniine.—A. Ladenburg. Pure coniine boils at 166–167° C. and has a specific rotation equal to $[a]_D = + 15.6°$. This number is identical with that given by Schiff, which has been mistaken by Landolt for the angle of rotation, and used by him for the calculation of the specific rotation.—Ber. d. Chim. Ges., 1894, 858.

Isoconiine Derivatives.—Labors of Simon (Bull. Soc. Chim.), Ladenburg, (Ber. d. Chem. Ges.)—Abstract in Jour. Chem. Soc., Chem. News, etc.

CORONILLIN.

Coronillin.—A glucoside prepared from the seed of Coronilla scorpioides. It forms a yellow, loose powder, soluble in water and in alcohol. It may be regarded, according to Spillman and Haushalter (Wien. Med. Presse; 1804, 411), as a cardiac favorably influencing certain symptoms produced by deficient energy of the cardiac muscle. The beneficial effect manifests itself quickly after ingesting the medicament, but usually disappears as soon as its administration is interrupted. Its action consists in strengthening pulsation, increasing diuresis, and decreasing œdema and dyspnœa. It is inefficient, like digitalin, when the cardiac muscle is greatly degenerated. The following formulas are given:

1.—Coronillin	2 Gm.
Tinct. coronilla varia	20 Gm.
Glycerin Syrup coffee ... of each,	5 Gm.

Ten drops 3–6 times a day.

2.—Coronillin	2.5 Gm.
Powdered althæa	0.5 Gm.
Mucil. quince seed	sufficient to make 25 pills.

One pill 6 times a day.

CONVOLVULIN.

Convolvulin.—W. Kromer, continuing his researches on the convolvulaceous resins, has investigated convolvulin obtained from jalap. He finds that this body splits up on treatment with baryta, even without heat, into convolvulinic and methyl-ethyl-acetic acid; the latter, being volatile, appears to have been overlooked by certain investigators. Convolvulinic acid is monobasic, and its solution possesses the property of dissolving convolvulin; by hydrolysis it yields convolvulinolic acid and a glucose, the nature of which could not be satisfactorily determined. Convolvulinolic acid is also monobasic and isomeric, but not identical with jalapinolic and scam monolic acids. Mayer's convolvulinol, the author considers to be impure convolvulinolic acid.—Pharm. Zeits. Russl., xxxiii., 1.

CORYDALINE.

Corydaline—Oxidation with Potassium Permanganate.—J. J. Dobbie and A. Lander have obtained a new substance—corydalinic acid.—Jour. Chem. Soc., 1894, 57.

CURCIN.

Curcin.—A. Siegel (Bot. Centralb., xlvii., 120), finds the seeds of Jatropa curcas, L., to possess a poisonous principle, curcin, which he considers analogous to ricin, and places in the class of toxalbumins.

CYSTISINE AND ULEXINE.

Cystisine and Ulexine.—Crystallographic examination of the salts of these two alkaloids yields, according to A. Partheil, further proof of their identity. The nitrates, hydrobromides, and dextro-tartrates were examined, and the question of identity may now be considered finally settled.—Arch. der Pharm., 1894, 161.

DATISCIN.

Datiscin and its Products.—E. Schunck and L. Marchlewski find the root of Datisca cannabina to contain a glucoside ($C_{21}H_{24}O_{11} +_2 2H_2O$) which yields rhamnose and datiscetin.—Lieb. Ann. Chem., 1893, 261; Chem. Zeit., 1893 (Rep.), 317.

DIGITALIS GLUCOSIDES.

Pure Digitonin—Preparation of.—H. Kiliani.—The solution in hot 80 per cent. alcohol of the crude substance should not be allowed to cool, but should be placed on a water-bath at 45° C. kept for six hours at this temperature, and then allowed to cool slowly. The glucoside is then deposited in a form in which it is much more easily drained by the pump.—Arch. Pharm., 1893, 460.

Digitoxin as a Cardiac.—Masius (Med. Week, 1893, No. 18) reports that he employed digitoxin successfully in doses amounting to 1.5 milligrammes [$\frac{1}{40}$ gr.] in 24 hours; and that it is fully as efficacious as digitalis in cases of heart disease. Heger remarks that this substance acts especially on the left ventricle. Van Aubel declared that digitoxin has all the physiological properties of digitalis, while producing its effects much more rapidly.

Dangerous Difference Between Amorphous and Crystalline Digitalin and Aconitine.—The Journal der Pharmacie von Elsass-Lothringen points out a serious danger in prescribing digitalin and aconitine. In 1866 the only specimens of these active principles were the amorphous forms. Dunstan, together with his pupils, has succeeded in emphatically showing the difference in toxic properties between crystallized (true) aconitine and the ordinary amorphous alkaloid, and urges the necessity of a recognition of this in the British Pharmacopœia. But whereas only the impure amorphous forms were known in 1866, the compilers of the Codex were safe in fixing the dose, generally administered in granules, at 1 milligramme. But the Codex of 1884 mentions amorphous digitalin, crystalline digitalin, and only crystalline aconitine; and yet the dose remains at 1 milligramme for the official granule. And in cases where the dose of a granule is not indicated by the prescriber, it is natural to expect that the official dose would be dispensed. If the therapeutic activity of the amorphous digitalin of the 1866 Codex be compared with that of 1884, it will be found that the latter, which is entirely soluble in chloroform, is nearly four times as strong as the former, and consists of 90 per cent. of true crystalline digitalin. In the case of aconitine, it is absolutely dangerous to use it in doses of 1 milligramme, if the crystalline alkaloid be employed. In fact, fatal cases have been known when this quantity has been administered. The importance of attention to these points cannot be overestimated.—Druggists' Circular, 1893.

EPHEDRINE.

Ephedrine.—An alkaloid isolated by Nagel (Berlin Klin. Woch., 1887, No. 38), but concerning which nothing has yet been published. Merck isolated the same base, with a melting point for the hydrochlorate of 210° C., in the year 1888, from the Ephedra vulgaris, var. Helvetica, but on account of lack of material could not prosecute his studies of the alkaloid. The alkaloid is extracted from the alcoholic extract by treating with alkali and ether, and is then converted into the hydrochlorate and purified by re-crystallization. The alkaloid itself forms a white crystalline mass, boiling at about 255° C., without decomposition. It is soluble in alcohol and ether and in water, forming with the last a hydrate. The hydrochlorate crystallizes from alcohol in white crystalline needles, with a melting point of 214–215° C., and is readily soluble in water.

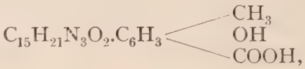
ERYTHRININE.

East Indian Plant Constituents.—Erythrinine (not to be confounded with the dye stuff erythrin), is an alkaloid obtained from the bark of Erythrina (Stenotropsis) broteroi, Haask, an Australian tree. This is probably identical with the alkaloid called erythrin, obtained from a Brazilian Papilionaceæ (Erythrina corallodendron, L.), called casca de mulunge. The first alkaloid has been examined physiologically by Plugge, and found to be useful in poisoning by strychnine. In its action it much resembles that of cystisine, the alkaloid of Cystisus kaburnum, with which, however, it is not identical.—Amer. Drug. and Pharm. Rec., 1894, 32.

ESERINE.

New Eserine Salts.—All the eserine salts thus far employed, excepting the salicylate, are very deliquescent, and hence difficult to obtain dry.

Their therapeutic importance induced A. Petit and M. Polonovski (Jour. Pharm. Chem., 1894, 55) to try to make well-crystallized and stable salts. Eserine benzoate, $C_{15}H_{21}N_3O_2C_6H_5COOH$, was obtained by disssolving, separately, 55 parts of eserine and 25 parts of benzoic acid in absolute ether, and mixing the two solutions. This mixture, exposed to slow evaporation, yielded very hard and white crystals, which were then washed with a little ether, to remove the last traces of benzoic acid. The final product is said to be very stable; it may remain exposed to air for a long time without alteration. M. P. between 115° and 116° C., and it contains about 69.5 per cent. of eserine. Eserine benzoate is very soluble in water (1 : 4) at 18° C., and in alcohol, less so in ether; the solutions are neutral. Eserine meta-cresotate,



$$C_{15}H_{21}N_3O_2.C_6H_3\begin{cases}CH_3\\OH\\COOH,\end{cases}$$

was obtained as a well crystallized, stable salt, insoluble in ether. Equivalent quantities of eserine and of meta-cresotic acid were separately dissolved in ether and the two solutions mixed, when a reaction was noticed which in a few moments resulted in a crystalline precipitate. The crystals were filtered off, and dried in the air. They are described as little, white prisms, M. P. 156°–157° C., and very stable in both light and air, not suffering the least alteration, even after several weeks' exposure to the air; almost insoluble in ether and in about 60 parts of water at 15° C., forming neutral solutions which keep quite long without coloring. Eserine citrate was obtained by mixing ethereal solutions of eserine and of citric acid—the latter dissolves rather freely in ether, especially when warm; acid citrate of eserine precipitates as a white, crystalline powder. Even if a large excess of eserine is employed, an acid salt is always formed. The precipitate should be quickly filtered off and dried over sulphuric acid. This salt is very hygroscopic, and soluble in water and alcohol; its solutions have an acid reaction. Eserine tartrate was obtained by thoroughly saturating a definite quantity of eserine with tartaric acid. The solution was kept in vacuo over sulphuric acid. After several days, a mealy, crystalline, very deliquescent mass remained.—See Bull. Soc. Chim. de Paris, ix. and x., No. 24.

Detection of Eserine.—S. J. F. da Silva describes in detail a new reaction of eserine, which appears to be extremely sensitive, since he claims to be able to detect 0.005 Gm. of the alkaloid by its aid. A minute fragment of the alkaloid, or of one of its salts, is placed in a porcelain capsule and dissolved in one or two drops of fuming nitric acid. The clear yellow solution thus obtained, when heated on a water-bath, gradually changes to orange color, but, on evaporating to dryness, stirring meanwhile with a glass rod, the residue becomes green. This residue is soluble in water, more so in strong alcohol, and also in concentrated sulphuric acid, forming green non-fluorescent solutions, which, on evaporation, leave the substance unaltered in color. A drop of nitric acid, allowed to fall upon the green residue on the water-bath, causes it to turn blue in places where the acid is not directly in contact with it, and, later, a reddish-violet solution is formed, which changes after a while to greenish-yellow. This solution, when diluted, is fluorescent, appearing of a blood-red color by reflected light and greenish-yellow by transmitted light. Ammonia does not affect the color of the green substance, which M. da Silva proposes to name chloreserine (χλῶρος, green).—Compt. rend., 1893, 330.

Selection of Eserine.—The reaction referred to by J. B. Nagelvoort as being similar to that of da Silva, is described in the revised American edition of Flückiger's "Reactions," in the following extracts: "(*a*) An amorphous residue of a permanent blue color is obtained if a trace of the alkaloid, or one of its salts, is evaporated in the presence of an excess of ammonia; this blue alkaloid dissolves in dilute acids with a red color; sensitiveness 0.00001 Gm. ($\frac{1}{100\,000}$). The solution has a beautiful red fluorescence in reflected light; when evaporated, it leaves a residue that is green at first, changing to blue afterwards, the blue residue being soluble in water, alcohol, and chloroform, but not in ether. Chloroform extracts the blue color from the watery ammoniacal solution only partially. The blue solutions are reddened at first by H_2S, and discolored afterwards. The blue color is restored by expelling the H_2S on the water-bath. (*b*) A red fluid is obtained when 0.010 Gm. eserine or its salicylate, 0.050 Gm. of slacked lime, and 1 C.c. of water are added together. Warmed in a water-bath, it turns green, and a piece of red litmus paper suspended in the test-tube colors blue; a glass rod moistened with HCl gives off the well known white clouds characteristic of an ammonia reaction. The green solution does not lose its color by evaporation. Baryta water added to an eserine solution gives a white precipitate that turns red when strongly agitated; sensitive to 0.00001 Gm. ($\frac{1}{100{,}000}$). Dissolve for this test 0.010 Gm. eserine salicylate in 100 C.c. of water (1 : 10000). One C.c. of this, agitated with five C.c. of baryta water, gives a bright pink-red colored fluid. One C.c. of the 1 : 10000 solution diluted to ten C.c. will give a faint pink-red colored fluid, when shaken with five C.c. of baryta water; one C.c. = 1 : 100,000." In substance the above description appeared in the original German text by Professor Flückiger (Berlin, 1892), but it has been somewhat elaborated and extended by the translator.—Pharm. Jour. Trans., 1893, 343.

EUPARIN.

Euparin.—C. C. Manger has further examined this constituent. (See Proc. 1890). The author concludes that euparin forms no sulphur compound with concentrated sulphuric acid. With chlorine it forms a definite but quite unstable substitution product. With acetic anhydride a very unstable liquid compound is formed. Concentrated nitric acid converts euparin into picric acid. On fusion with potassium hydrate, euparin is converted chiefly into phloroglucol.—Amer. Jour. Pharm., 1894, 120.

EURYBIN.

Eurybin.—A glucoside obtained from Eurybia moschata, a composite of New Zealand. It is described (Merck's Bericht, 1893, 12) as an amorphous, faintly-yellow powder of bitter taste, clearly soluble in water and in alcohol. The aqueous solution is not rendered turbid by neutral lead-acetate; basic lead-acetate, however, causes precipitation. Tannin produces a flaky precipitate, quickly transforming itself, on being shaken, into a resin-like mass, which, after the removal of the aqueous mother-liquor, is clearly soluble in alcohol. No reduction takes place on heating with Fehling's solution. On saponifying the resinous conglomeration with 5 per cent. sulphuric acid, a resin separates, which is clearly soluble in alcohol, and whose aqueous solution reduces Fehling's solution—proof that eurybin is a glucoside. Kobert has instituted some experiments regarding the physiologic action of eurybin, and found that the glucoside acts as a poison on warm-blooded animals only when administered internally in relatively large doses, while small doses are absolutely non-poisonous, even by subcutaneous injection. Additional pharmacologic data are expected shortly.

GEISSOSPERMINE.

Geissospermine.—From the bark of Geissospermum vellosii two alkaloids were isolated by Hesse: Crystallizable geissospermine $C_{19}H_{24}N_2O_2+H_2O$ and amorphous pereirine $C_{19}H_{24}N_2O$. Under the name of geissospermine a beautifully crystallizable alkaloid is isolated by Trommsdorff; it has the formula $C_{23}H_{28}N_2O_4$, melts at 189° C., and unites with one molecule of the monobasic acids. The researches of Langgaard give it physiological action simulating that of strychnine and brucine. The alkaloid is easily converted by loss of water into an amorphous base, melting at 60–70° C. for which the formula $C_{46}H_{54}N_4O_7$ is calculated; this base unites with four molecules of monobasic acids to form salts, and by fusion with potassium hydrate yields a crystallizable base, melting at 151° C., which is being investigated.—M. Freund and Ch. Fauvet, in Ann. der Chem., 1893, 300.

GELSEMIUM SEMPERVIRENS.

Gelsemium sempervirens—Alkaloids of.—A. R. Cushing (Ber. d. Chem. Ges., 1893, 1725) has examined the alkaloids found in Gelsemium, retaining the names proposed by Gerrard and Thompson, namely, gelsemine for the alkaloid yielding crystalline salts, and gelseminine for the other.

(1) *Gelsemine* is a dry, non-crystalline mass, white in color, bitter, strongly alkaline and insoluble in water. Neither nitric nor sulphuric

acid gives color reactions, but if an oxidizing agent, such as manganese peroxide, cerium oxide or potassium dichromate be added to a solution in the latter liquid, it assumes an intense red color which gradually becomes green. The gold and platinum double salts are soluble in hot water, and on cooling separate in a crystalline state. An analysis of the hydrochlorate showed the formula $C_{49}H_{63}N_5O_{14}2HCl$.

(2) *Gelseminine* is amorphous, strongly alkaline, insoluble in water, but soluble in alcohol, ether and chloroform. The salts are amorphous, yellow and easily soluble in water. Sulphuric acid colors it yellow; nitric acid, green; sulphuric acid and oxidizing agents, violet gradually becoming green. The platinum double salt is amorphous and brownish-yellow in color, and easily soluble in water and alcohol. By liberating the alkaloid, polymerization takes place. Analysis showed the formula $C_{42}H_{47}N_3O_{14}HCl\text{-}PtCl_4$.

Gelseminine, precipitated from solutions of its pure salts, is a white, amorphous powder, which sinters at 105° C. and melts at 120°, undergoing partial decomposition. The analyses of the base and of some of its salts do not decide if its formula is $C_{24}H_{28}N_2O_4$ or $C_{22}H_{26}N_2O_3$. The hydrochlorate is crystallizable, while the sulphate, because of its solubility in water and alcohol, was only obtainable in discolored flakes by adding ether to the alcoholic solution. The best crystallizable salt is the nitrate, made by carefully adding nitric acid to the alkaloid suspended in water until a clear solution results; this, by standing, deposits crystals, melting with decomposition at 188° C. Platinic and gold chlorides cause respectively yellow and brown amorphous precipitates.—L. Spiegel, Ber. Chem. Ges. (Rep.), 1893, 177; Amer. Jour. Pharm., 1893, 381.

HELIANTHENIN.

Helianthenin.—The name applied by Ch. Tanret to a new principle which he isolated from Jerusalem artichoke (Helianthus tuberosus). It crystallizes in fine microscopic needles, is soluble in its own weight of cold water, very soluble in dilute alcohol; but the solubility decreases rapidly with increase of the alcoholic titre; fuses at 176° C.; its aqueous solution shows the rotation $a_D = -23.5°$, and the formula is $12(C_{12}H_{10}O_{10}).3H_2O_2$. Helianthenin does not reduce Fehling's solution and is not precipitated from its aqueous solution either by baryta or by subacetate of lead.—Jour. Pharm. Chim., 1893, 107.

HYDRASTINE.

Hydrastine.—M. Freund and F. Lutze have prepared the following compounds: Benzyl hydrastine, Benzoyl hydrastamide, Benzoyl hydrasteine.—Ber. d. Chim. Ges., 1893, 2488.

Hydrastine.—E. Schmidt has continued the investigations upon the product obtained by F. Schmidt and possessing the formula $C_{20}H_{18}O_7$.

Results confirm this formula, and the author proposes the name hydrastonic acid for the same. He has investigated the action of hydroxylamine upon methyl hydrazine, the behavior of hydrastine towards acetyl chloride, also the action of ammonia, etc., upon hydrastine methyliodide.—Arch. der Pharm., 1893, 541.

HYPAPHORINE.

Hypaphorine.—This is the name given to an alkaloid extracted by P. C. Plugge from the Hypaphorus subumbrans, Heskl. (Papilionaceæ) a tree found growing in Java. It forms colorless crystals which decompose without melting at 220° C. and are readily soluble in water. Hypaphorine cannot be extracted from alkaline or acid solutions by ether, petroleum ether, benzol or chloroform. It is dextro-rotatory, solutions of its salts are not precipitated by alkalies or alkaline carbonates, and it has been found to act as a poison to frogs.—Rép. de Pharm., 1893, 507; Archiv. f. Exp. Path., 1893, xxxii.

IPOMŒIN.

Ipomœin.—Kromer Nicolai (Pharm. Zeitschr. f. Russl., 1893; Pharm. Post, 1894, 95) has recently completed a very thorough study of Convolvulus panduratus, L., or Ipomœa pandurata, M. The investigation deals with the chemical behavior of the glucoside ipomœin; and the conclusions reached are presented in the following summary:

1. The root of Convolvulus panduratus, L., contains a glucoside insoluble in ether, which differs in character from the familiar Convolvulaceæ glucosides, and for which he proposes the name ipomœin. 2. The ipomœin is disintegrated by the action of bases into a volatile acid of the formula $C_5H_8O_2$ (β-methylcrotonic acid?) and ipœinic acid.

$$C_{78}H_{132}O_{36} + 2Ba(OH)_2 = (C_5H_7O_2)_2Ba + (C_{34}H_{61}O_{18})_2Ba.$$

3. Ipœinic acid is monobasic and possesses the charater of a glucosidic acid. 4. Mineral acids disintegrate ipœinic acid into ipomeolic acid and sugar. The ipomœin is thus resolved into ipomeolic acid, sugar, and a volatile acid of the formula $C_5H_8O_2$ (β-methylcrotonic acid?). 5. Ipomeolic acid is monobasic, of the composition $C_{16}H_{32}O_3$. 6. Nitric acid oxidizes the ipomœin into a sebacic acid with melting-point at 98.6° C. and into a valerianic acid ($C_5H_{10}O_2$).

IRIDIN.

Iridin in Iris florentina.—G. de Laire and F. Tiemann (Ber. d. Chem. Ges., 1893, 2010) obtained on extraction of the roots of Iris florentina, a glucoside iridin, $C_{24}H_{26}O_{13}$, which crystallizes in white needles, melts at 208° C. and turns yellow in the air. On heating with dilute sulphuric acid it splits into glucose and irigenin, $C_{18}H_{16}O_8$. This latter, with strong alkalies, yields iridic acid and a phenol, iretol, $C_6H_2(OH)_3.OMe$ [=2 : 4 :6 : 1].

IRONE.

Irone.—An odorous principle, has been isolated by Tiemann and Krüger from orris root, which is known to possess the aroma of violets. It is a methylketone, having the formula $C_{13}H_{20}O$. An isomeric ketone was prepared synthetically from citral, the odorous principle of lemon oil, and which is also present in other oils. This ketone is called ionone ; it has an odor very much like that of irone, but is a little milder, and recalls the odor of flowering violets ; it is believed that one of these substances is present in violets, but the quantity is so exceedingly small that its preparation is only possible on a large manufacturing scale.—(Berliner Akad.) Pharm. Ztg., 1893, 699.

KOSIN.

Kosin or Koussin.—Max Leichsenring has re-investigated kousso flowers, and isolated a crystalline inactive body, protokosin, and an amorphous highly active substance kosotoxin ; from the latter a yellow crystalline inactive body apparently identical with commercial kosin, could be obtained by boiling with hot baryta water, purifying and crystallizing. The author concludes that commercial kosin is not a natural constituent of kousso flowers, but is produced from one of the constituents during the process of isolation.—Arch. der. Pharm., 1894, 50.

LUPINUS ALKALOIDS.

The Alkaloids of Lupinus Albus.—The powdered seeds are boiled with two successive portions of water, the decoctions united and evaporated to an extract consistency ; this is mixed with some milk of lime, and then dried by the addition of dry slaked lime. The dry powder is extracted with petroleum benzin (b. p. 85–150°) ; the solution is agitated with dilute hydrochloric acid, and from this solution the alkaloids are liberated by potassa and extracted with ether. The ethereal solution upon evaporation left a honey-like crystalline mass, which by expression and the use of ether and benzin was separated into two alkaloids, one crystallizable, the other liquid and uncrystallizable (except when kept in vacuo over sulphuric acid—it then forms very deliquescent crystals). Both alkaloids are monacid, have the formula $C_{15}H_{24}N_2O$, and form aqueous solutions becoming turbid upon heating ; they differ only in physical properties and the melting points of the salts. The liquid alkaloid is probably identical with the lupanine of Hagen, extracted from Lupinus angustifolius ; it yields a dextrogyre hydrochlorate melting at 131–132° C. and an aurochloride melting at 198–199° C. The crystallizable alkaloid melts at 99° C. and forms salts which are more soluble and more fusible than the corresponding salts of the liquid alkaloid ; the optically inactive hydrochlorate melts at 105–106° C., the aurochloride at 182–183° C.—A. Soldaini, Arch. der

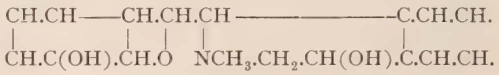
Pharm., 1893, 321–345. (See, also, L'Orosi, 1893, 109; Jour. Chem. Soc. (Abstr.), 1893, 739.)

OPIUM ALKALOIDS.

Alkaloids of Papaveraceæ.—M. M. Vallada, in Naturaleza (Ser., II.), II., 212.

Morphine—Constitution of.—G. N. Vis summarizes the known facts with regard to morphine, and the conclusions to be drawn from them are as follows: (1) The nitrogen atom in morphine has a methyl group attached to it. (2) Morphine is a tertiary base. (3) Morphine yields pyridine in several reactions, and, therefore, probably contains a pyridine ring. (4) Morphine derivatives easily pass into phenanthrene derivatives, indicating either the presence of a phenanthrene nucleus or an unusual predisposition for the production of one. (5) By suitable oxidation, morphine yields picric acid, and by fusion with caustic alkali, protocatechuic acid; both reactions indicate a benzene ring, and the latter suggests analogy of constitution with that of papaverine, which so readily yields protocatechuic acid. (6) Morphine contains two hydroxyl groups, one of which has phenolic functions, the other alcoholic functions. The third oxygen atom in morphine is indifferent, and apparently of an ethereal nature. (7) The hydroxyl group, which is apparently alcoholic, retains its character in methylmorphimethine, and also, it would seem, in the hydroxyethyldimethylamine.

Ill-content with Knorr's formula for morphine, the author suggests the following as being in accord with the above facts:



$$\begin{array}{l}\text{CH.CH——CH.CH.CH——————C.CH.CH.}\\ |\qquad\qquad\quad |\;\;|\;\;\;|\qquad\qquad\qquad\qquad\quad |\\ \text{CH.C(OH).CH.O}\;\;\text{NCH}_3\text{.CH}_2\text{.CH(OH).C.CH.CH.}\end{array}$$

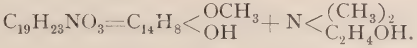
He proceeds to explain the decomposition of methylmorphimethine into hydroxyethyldimethylamine and hydroxymethoxyphenanthrene in the light of this formula, and proposes structural formulæ for pseudo and apomorphine.—Jour. f. prakt. Chem., 47, 584–591.

Constitution of Morphine.—Knorr has shown in previous communications (Ber. d. Chem. Ges., xxii., 181, 1113), that morphine by treatment with methyliodide and sodium in methylalcohol solution yields methylmorphine methiodide (codeine methiodide), and this by treatment with sodium hydrate yields methylmorphimethine. These reactions may be expressed by linear equations, thus:

$$C_{17}H_{19}NO_3+CH_3OH=C_{17}H_{18}(CH_3)NO_3+H_2O.$$
$$C_{17}H_{18}(CH_3)NO_3+CH_3I=C_{17}H_{18}(CH_3)NO_3CH_3I.$$
$$C_{17}H_{18}(CH_3)NO_3.CH_3I+NaOH=C_{17}H_{17}(CH_3)_2NO_3+NaI+H_2O.$$

He further found that methylmorphimethine on treatment with acetic anhydride yields:

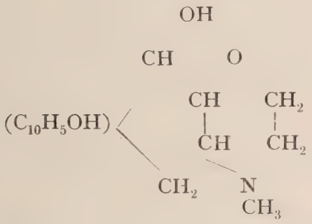
(1) An oily base giving the same analytical data as methylmorphimethine, but differing in other respects; (2) methoxyhydroxyphenanthrene; and (3) oxyethyldimethylamine, thus:



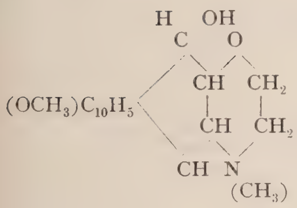
$$C_{19}H_{23}NO_3 = C_{14}H_8 < \begin{matrix} OCH_3 \\ OH \end{matrix} + N < \begin{matrix} (CH_3)_2 \\ C_2H_4OH. \end{matrix}$$

He now finds that the oily base above referred to is the optical isomer of methylmorphimethine. When methylmorphimethine is treated with acetic anhydride, only about one-half undergoes decomposition, and the other half is removed as the other modification. Gaseous hydrogen chloride acts in a similar manner, only a portion of the methylmorphimethine being decomposed into dioxyphenanthrine, methyl chloride, and the chlorethyldimethylamine. The α- and β- methylmorphimethine differ in rotatory power, solubility in ether, melting point of their derivatives and salts, and also in their toxic effects.

These facts support the formulæ previously suggested by the author for morphine and dimethylmorphine respectively.



Morphine.



Dimethylmorphine (methylmorphimethine).

—Ber. d. Chem. Ges., 1894, 1144.

Excretion of Morphine Through the Saliva.—This has been pointed out by Rosenthal, in Deutsche Medizinische Zeitung, 1893, 511. Even in subcutaneous injections of only one grain a day, has it been plainly detected, and hence is highly recommended where morphine poisoning is suspected.

Codeine.—W. Göhlich, in continuation of his investigations, has prepared dicodeinethylenebromide and dicodeinethylenechloride.—Arch. der Pharm., 1894, 154.

Codeine Salts.—Phosphate of codeine contains 76 per cent. of alkaloid, and is soluble in four parts of water. Hydrochlorate contains 80 per cent..

and is soluble in 20 parts of cold water; and sulphate contains 76 per cent. of alkaloid, and dissolves in 35 to 40 parts of cold water. The phosphate appears, then, to be most suitable for hypodermic use.—Rép. de Pharm., 1894.

Narceïne.—M. Freund and G. B. Frankforter find that Anderson's formula for narceïne, $C_{23}H_{29}NO_9+2H_2O$, which is the generally received one, requires modifying to $C_{23}H_{27}NO_8+3H_2O$.—Ann. der Chem., 1893, 20.

——— *Iodides of.*—G. B. Frankforter describes these compounds. The blue iodide $(C_{23}H_{27}NO_8)_3I_2+3H_2O$, is formed when narceine is treated with an aqueous solution of iodine. Also, by treating crystals of narceine direct with iodine, indigo-blue crystals are formed, which retain the same crystalline form as the narceine. On heating these crystals they change from fine long prismatic needles to short irregular ones. The blue crystals are slightly soluble in water, soluble with difficulty in alcohol, quite insoluble in ether or chloroform, and melt at 176°–177° C. The red iodide $(C_{23}H_{27}NO_8)_3I$, is formed by treating narceine with an alcoholic solution of iodine, the grayish-blue product changing to red and losing its crystalline form on standing in the air or gently heating. It melts at 181° C., and is insoluble in water, alcohol or ether. Both iodides are transformed into narceine by carefully neutralizing with sodium hydroxide. In the presence of an alkali no iodide is formed from narceine.—Journ. Am. Chem. Soc., xvi., 361.

Morphine in Hong Kong—Restrictions to the Use of.—Pharm. Jour. Trans., 1893, 428.

Oxidation of Morphine by Fungous Growths.—A. Lamal states that by cultivating certain molds in a solution of morphine sulphate, to which were added the mineral salts necessary to the growth of the molds, he has determined that the morphine undergoes oxidation to a certain extent. The matter is yet under investigation, but the results of Lamal are contrary to those of most previous investigators. To what extent the added mineral salts influence the oxidation is not stated.—Nat. Drug., 1894, 26.

Narceine and Aponarceine.—When commercial narceine is heated with a concentrated alkali hydroxide solution, the narceine loses a molecule of water and forms the alkali salt of a new compound called aponarceine: $C_{23}H_{29}NO_9 + NaOH = C_{23}H_{26}NO_8Na + 2H_2O$. This alkali salt in aqueous solution upon the addition of an acid reunites with one molecule of water and forms chemically pure narceine melting at 163° C.: $C_{23}H_{26}NO_8Na + HCl + H_2O = NaCl + C_{23}H_{29}NO_9$; if, however, to the alcoholic solution of the sodium aponarceine an alcoholic solution of an acid be added, either free aponarceine, $C_{23}H_{27}NO_8$, melting at 157–158° C. or one of its salts like $C_{23}H_{27}NO_8HCl$ will be formed, dependent upon the quantity of the acid added. These several preparations are intended for medicinal use and are covered by a German patent.—Chem. Ztg., 1893, 840.

OXYACANTHINE.

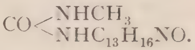
Oxyacanthine ($C_{18}H_{19}NO_3$).—An alkaloid found in Berberis bark, beside berberine. It is described as a white crystalline powder, soluble in chloroform, and melting at 210° C. According to A. Curci, oxyacanthine acts upon the brain, medulla, and spinal cord as an irritant and paralyzant poison; the lethal dose in rabbits, subcutaneously, is 10–20 Cgm. Therapeutic data are yet wanting. Oxyacanthine sulphate $(C_{18}H_{19}NO_3)_2 \cdot H_2SO_4 + 2H_2O$, occurs as small, white crystals, souble in hot water.—Merck's Bericht., 1893, 71.

PHYSOSTIGMA ALKALOIDS.

Physostigma—Alkaloids of.—Calabar bean, the seed of Physostigma venonosum, contains, as is known, the alkaloids physostigmine (or eserine) and eseridine; the former possesses valuable therapeutic properties, while the latter is of much less importance. Eserine has the formula $C_{15}H_{21}N_3O_2$; eseridine, $C_{15}H_{23}N_3O_3$. A fluid alkaloid called by Harnack, calabarine, has not as yet been obtained in a pure state, it is stated. Eserine, as it is known, is readily decomposed by alkalies, forming a red pigment—rubreserine—which turns, after standing for some length of time, into eserine-blue. If alkali solution be added to an eserine salt, to dissolve it, there will arise a red coloration, soon turning to brown, with the appearance of an anine-like odor. The change does not occur when the action of the alkali solution takes place in a current of hydrogen gas. On boiling eserine with potassa solution, under the exclusion of air, methylamine and carbon dioxide are formed, it is stated; and when the remaining product is shaken out with ether, a new base, eseroline, is obtained:

$$\underset{\text{(Eserine.)}}{C_{15}H_{21}N_3O_2} + H_2O = CO_2 + CH_3NH_2 + \underset{\text{(Eseroline.)}}{C_{13}H_{18}NO_2}.$$

The slightest moisture causes a red coloration. From this decomposition of eserine it may be inferred that this alkaloid possesses a urea-like structure:



$$CO\begin{cases} NHCH_3 \\ NHC_{13}H_{16}NO. \end{cases}$$

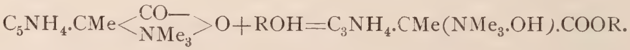
By heating with alcoholic ammonia to 150° C. a colorless solution is obtained from which eseroline may be isolated, on exclusion of air. Besides eseroline, methyl-urea is also formed. Eseridine also gives off methylamine and carbon dioxide when boiled with potassa solution; but it yields no rubreserine on oxidation. The author reports to have isolated a fluid alkaloid, eseramine. It is present in insignificant quantities only, and has the formula, $C_{16}H_{25}N_4O_3$. Eseramine is not identical with calabarine, as it has no effect whatever when injected subcutaneously.—Ehrenberg, in Pharm. Zeit., 1894.

PICRAMNIN.

Picramnin.—A crystallizable principle isolated by Peckolt from the fruit of Picramnia camboita, Engl., by extraction with petroleum ether and crystallization from alcohol, has been further studied by B. Grützner with the result that both physical and chemical properties place it among the fats, it being the glyceride of an unsaturated fatty acid, and having the formula $C_3H_5(C_{18}H_{31}O_2)_3$.—Chem. Ztg., 1893, 879.

PILOCARPINE.

Physiological Action of Pilocarpine.—A. Curci. Pilocarpine produces hyper-secretion, convulsions and paralysis. The paralysis is accounted for by regarding pilocarpine as a quaternary ammonium compound. But phenol and oximhydroxyl groups, the most powerful in producing hyper-secretion and convulsions, are absent. It is not improbable, however, that in the organism changes may occur, a pilocarpinate being formed with the bases of the body, thus:



$$C_5NH_4.CMe\left<\begin{matrix}CO-\\NMe_3\end{matrix}\right>O+ROH=C_3NH_4.CMe(NMe_3.OH).COOR.$$

In dogs, the drug leaves the body in the urine partly as free pilocarpine and partly as such a pilocarpinate.—Chem. Centralb., 1893, 659; from Annali. Chim. Farm., 1894, 3–8.

Test for Pilocarpine Nitrate.—J. B. Nagelvoort (Pharm. Rundsch., 1893, 285) states that the identity tests for pilocarpine given by the U. S. Pharmacopœia—treating solution in sulphuric acid with potassium dibromate, and with fuming nitric acid—do not give with pilocarpine nitrate the color reactions there mentioned. The proof of the existence of nitric acid is easy and positive; but the identity test for pilocarpine given in connection with the hydrochlorate, does not hold good for the nitrate, it is maintained. The following method, however, is said to be perfectly reliable: In a separator dissolve 0.5–1 Cgm. of pilocarpine nitrate in 5 C.c. of water, add a few drops of ammonia water, and shake out with about 10 C.c. of chloroform. When both fluids have become clear, the chloroform layer is drawn off into a porcelain capsule, and evaporated. The residue is mixed with 1 Cgm. of calomel by stirring with a glass rod. The characteristic black color reaction will then appear, even without blowing over it, because pilocarpine is very hygroscopic per se.

Pilocarpine in Croup.—Sziklai (Aertzl. Prakt., 1893, p. 914) recommends pilocarpine hydrochloride in croup in doses of 0.02 to 0.07 Gm. per day for children of 15 years, and in doses of 0.08 to 0.10 per day for adults. The false membrane is thrown off by the increased exudation from the mucous membrane caused by the pilocarpine, and if not removed by natural means, may easily be removed by the physician.

PINUS.

Picein and Piceol.—Picein is the name applied to one of several new glucosides, obtained by M. Tanret, from the leaves of Pinus Picea (Sapin épicéa). Crystallized from water its formula is $C_{14}H_{18}O_7H_2O$. Both this and the anhydrous compound form silky prismatic needles, with a bitter taste. They are soluble in one part of boiling water, 50 parts of water at 15° C., 20 of alcohol at 70° C., and 68 at 90° C., 534 of absolute alcohol at 15° C., and 33 at boiling point, while acetic ether dissolves one part in 123 at 15° C. The glucoside is insoluble in ether and chloroform, is dextrogyre, and when anhydrous, melts at 194° C. Under the influence of emulsin, or of dilute acids, it is split up into glucose and "piceol," $C_8H_8O_2$. The latter melts at 109° C. and is soluble in 100 parts of water at 15° C., and in 14 parts at 100° C.—Compt. rend., 1894, 80.

PIPERIN.

Piperin Not Tasteless.—Th. Wiegle (Pharm. Zeit., 1893, 584) claims that it can best be demonstrated by tasting a hot solution of it.

PITHECOLOBIN.

Pithecolobin.—Obtained from Pithecolobium saman, Benth. (Mimoseæ), a shade tree of coffee plantations in Japan. It is identical with the other alkaloids obtained from other species of pithecolobium. Previously (Apoth. Zeit., 1891, 29) Plugge called it an alkaloidal sapotoxin. To the taste it is burning. It is highly poisonous, and agrees with those alkaloids whose aqueous solutions become milky upon warming and that froth upon shaking. The physiological action of this substance agrees with those made by Plugge upon his sapotoxin.—Greshoff in Pharm. Weekblad voor Neder., 1893, Nos. 28 and 31.

POMEGRANATE ALKALOIDS.

Pomegranate Alkaloids.—Ciamician and Silber find that the pseudo-pelletierine of Tanret is a tertiary base, in all probability belonging to the class of keton-amines; the products of its reduction are perfectly analogous with those of tropine. The authors propose to change the name "pseudo-pelletierine" into "granatonine," to indicate its character as a keton-amine. —Apoth. Ztg., 1893, 625; see Ber. d. Chem. Ges., 1893, 2738.

PYRIDINE BASES.

Action of Chloral on Pyridine Bases from Messel.—A. Einhorn and A. W. Gilbody.—A mixture of pyridine bases, obtained in distilling the bituminous shale of Messel, near Darmstadt, was separated into two portions, boiling respectively below 137° C. and from 137° to 160° C., and these portions were treated separately with chloral. From the first, the compound of chloral with 2-picoline was isolated; from the second, a compound with 2 : 6-lutidine, hitherto unknown.—Ber. d. Chem. Ges., 26, 1414–1422.

QUERCITRIN.

Quercitrin and Similar Principles.—These have been investigated by U. Rudolph, with a view of establishing their identity or points of difference. The yellow coloring principles of the following plants were made according to the directions of the discoverers: (1) Quercitrin bark (quercitrin). (2) Sophora japonica (sophorin). (3) Viola tricolor var. vulgare (viola-quercitrin). (4) Æsculus hippocastaneum (æsculus-quercitrin). (5) Capparis spinosa (capparis-quercitrin). (6) Thuja occidentalis (thujin). The composition of these principles is expressed by the following formula, showing that a close relationship exists between some of them: (1) $C_{21}H_{20}O_{11}$; (4) $C_{21}H_{22}O_{12}$ or 1, with one molecule H_2O; (2), (3) and (5) have the formula $C_{27}H_{30}O_{16}$; (6) has an intermediate formula and differs also in that the decomposition product thujetin yields reactions differing from those obtainable with the decomposition products of the other five principles. (1–5) inclusive, by hydrolysis, give isomerous products having the formula $C_{15}H_{10}O_7$, but which are not considered identical because of differences in melting points and solubilities. The hydrolyses are indicated by the two following reactions: $C_{21}H_{20}O_{11}+2H_2O=C_6H_{14}O_6+C_{15}H_{10}O_7$; $C_{27}H_{30}O_{16}+3H_2O=C_6H_{14}O_6+C_6H_{12}O_6+C_{15}H_{10}O_7$. The isodulcite ($C_6H_{14}O_6$) showed some differences in crystalline form; in (2), (3), (5) and (6) the isodulcite is accompanied by a fermentable sugar. Notable differences are apparent when the amounts of sugar and isodulcite (expressed as isodulcite) and the quercetin-like bodies (quercetin, sophoretin and thujetin) obtained by hydrolysis are compared.

	1.	2.	3.	4.	5.	6.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Isodulcite........	38.99	57.16	55.78	36.83	56.73	38.16
Quercetin, etc.....	68.68	49.54	51.86	65.65	49.61	62.25

—Pharm. Post, 1893, 529.

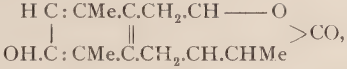
RUBIADIN.

Rubiadinglucoside and Rubiadin—The Constitution of.—L. Marchlewski gives four feasible formulæ for rubiadinglucoside and three for rubiadin.—Jour. Chem. Soc., 1893, 1137.

SANTONIN.

Santonin.—A. Andreocci. The formula for santonin, which, according to Klein (Ber. d. Chem. Ges., 1893, 2506), the author has quoted incorrectly from the paper by Cannizzaro and Gucci (Real. Accad. Linc., 1892, 149), accurately expresses all that has been proved concerning the constitution of santonin, and only differs from that put forward by Cannizzaro in the nature of the lactone combination, which is acknowledged by the last named chemist to be still an open question.—Ber. d. Chem. Ges., 1893, 2985.

Santonin and Santonous Acid—New Isomerides of.—A. Andreocci. When santonin is dissolved in fuming hydrochloric acid, and the solution allowed to remain in a cool place, desmotroposantonin crystallizes out. This substance is isomeric with santonin, and has the constitution



$$\begin{array}{l}\mathrm{H\,C:CMe.C.CH_2.CH}\text{——}\mathrm{O} \\ \quad | \qquad\qquad \| \qquad\qquad\qquad\qquad > \mathrm{CO}, \\ \mathrm{OH.C:CMe.C.CH_2.CH.CHMe}\end{array}$$

the $CH_2.CO$ group of santonin having been doubtless converted into $CH:C(OH)$. It forms small, white needles, melts at 260° C. when quickly heated, and has specific rotation + 11.2°. It has lost the ketonic properties of santonin, but has acquired phenolic properties, for it yields an acetyl derivative, melting at 156° C. It retains the lactonic properties of santonin.—Ber. d. Chem. Ges., 26, 1373–1376.

Santonin.—J. Klein. By the distillation of santonin a compound is obtained which is soluble in alkali, and crystallizes from dilute alcohol in plates; it melts at 97°–98° C. and has the formula $(C_{12}H_{13}O)_2$. The yield is small. Oxysantogenenic acid, in a similar manner, yields a compound $C_{12}H_{14}O$, which crystallizes in needles, melts at 111°–112° C., and appears to be identical with Cannizzaro's hydrodimethylnaphtol.—Ber. d. Chem. Ges., 1893, 2506.

——— *Test for.*—Schermer (Nederl. Tijd. v. Pharm., 1893) has observed that if a few granules of santonin and 20–30 Mgm. of powdered potassium cyanide be slowly heated in a porcelain capsule until the mass melts, a beautiful red color will appear which rapidly changes into brownish-yellow. The fused mass yields with water a fluorescent solution—brown by transmitted light and green by reflected light—lasting some time.

Santonone.—G. Grassi-Cristaldi points out that Klein is in error in employing the formula $(C_{15}H_{18}O_2)_2$ for santonone instead of $(C_{15}H_{17}O_2)_2$, and further maintains the accuracy of his original observation that the melting point of santonone is 223° C., and not 200–201° C., as stated by Klein. The resulting questions raised by Klein will be found answered in the author's original communication on the subject.—Ber. d. Chem. Ges., 1893, 2988.

SCAMMONIN.

Scammonin.—This body is easily soluble in ether, alcohol, chloroform, benzene and acetic acid. It melts at 123° C. and has a specific rotation of 23° to the left. Its formula appears to be $C_{88}H_{156}O_{42}$. By the action of alkalies it is broken up into the bibasic scammonic acid, $C_{22}H_{44}O_{12}$. By oxidation it yields carbonic, oxalic, valerianic and sebacic acids, besides the above-mentioned scammonic acid. Mineral acids split off scammonol, valerianic acid and grape sugar, and by further action a carbohydrate which reduces Fehling's solution, has a rotation of 17.8° to the right, and whose phenylhydrazine compound melts at 191° C.—Drug. Circ., 1893, 226.

Turpethin.—The chief difference between this body and scammonin, is its insolubility in ether. It melts at 147° C., has a specific rotation of —30.14°, and possesses the formula $C_{76}H_{28}O_{36}$. By the action of alkalies it is converted into turpethic acid, $C_{38}H_{76}O_{24}$. By the action of mineral acids turpethol is split off, together with isobutyric acid and a sugar resembling, but not identical with, glucose.—Ibid.

SAPOTIN.

Sapotin.—This is the name given to a glucoside extracted by G. Michaud from seed contained in the Sapodilla plum, the fruit of Achras sapota. This tree has a febrifrugal bark, and diuretic and aperient seeds. The glucoside was obtained in minute crystals, melting at 240° C. In alcoholic solution they are lævogyre $[a]_D = 32.11$. Sapotin is very soluble in water, less so in alcohol, and insoluble in ether, benzene, or chloroform. Acetate of lead forms a gelatinous precipitate in an aqueous solution of the compound, the precipitate being soluble in excess of the reagent. The formula of sapotin is $C_{29}H_{52}O_{20}$, and when boiled with dilute sulphuric acid the compound decomposes, glucose and sapotiretin, $C_{17}H_{52}O_{10}$, being formed, the latter insoluble in water, but very soluble in alcohol.—Am. Chem. Jour., xiii., 572.

SCOPARIN.

Scoparin.—Isolated from the aqueous extract of Spartium scoparium, by Stenhouse, has the formula $C_{19}H_{16}O_8(OH)(OCH_3)$ (and not $C_{21}H_{22}O_{10}$); it melts at 202° C. if heated slowly, at 219° C. if heated rapidly. It crystallizes from 70 per cent. alcohol in yellow needles containing $5H_2O$ and becomes anhydrous at 105° C.; it is soluble in hot water, the solution reducing alkaline copper and silver solutions. Scoparin is not a glucoside, as by hydrolysis it yields no sugar, but a brownish yellow substance melting with decomposition at 260–270° C. having the formula $C_{20}H_{16}O_8 + 2\frac{1}{2}H_2O$. The difficultly soluble modification of scoparin, which is obtainable by boiling the above described substance with alcohol, forms a yellow powder melting at 234–235° C., and can be changed into the first form by dissolving in alkali and supersaturating with acid.—Goldschmidt and V. Himmelmayr, Apoth. Ztg., 1893, 566; Monatsh. f. Chem., 1893, 202.

SCOPOLAMINE.

Action of Scopolamine Hydrobromate—Contribution to the Study.—R. Ernest (Thesis of Yourieff) has studied the action of scopolamine hydrobromate, and comes to the following conclusions:

1. The preparations known in the market as hyoscine are in fact neither more nor less than scopolamine in various stages of impurity. From a chemical point of view these impurities are not considerable, but they are sufficient to completely modify the action of the article when used on man.

2. Scopolamine provokes in man a slowing of the pulse. When the dose is increased, the initial slowing is followed by a temporary acceleration, which in turn yields to a definite tardation. This latter action is noticeable in persons afflicted with cardiac complications, but is not found in old men, or men debilitated by disease or otherwise.

3. Scopolamine is an excitant of the vaso-motor centre, and consequently elevates the blood pressure. As far as can be determined by the sphygmograph, this elevation is not noted in cases of aortic trouble, nor in old men.

4. There is dilatation of the isolated organic vessels under the use of scopolamine.

5. Scopolamine has no perceptible effect on the respiration, nor upon the striated muscular tissues.

6. It diminishes the secretion of saliva and of sweat, and it bids fair to prove useful, therefore, against ptyalism and hyperidrosis, whether temporary or chronic.

7. Scopolamine is rapidly eliminated through the urine.

8. Excitability of the brain, augmented by atropine, is controlled and diminished by scopolamine. This latter action probably explains the calmative and hypnotic effects of scopolamine.

9. Administered in doses of from one-fourth of a milligram to one milligram, scopolamine possesses a calmative action on alienates. While without any curative properties in psychical affections, it renders incontestible services in every case where excitement weakens the subject, or interferes with the sleep of his fellow alienates.

10. It would appear that the prolonged administration is followed by the usual effects of hypnotics, a toleration of the remedy and a habit.

11. Cardiac lesions are not formal contra-indications to the administration of scopolamine. On the contrary, scopolamine is absolutely contra-indicated in renal affections and in advanced age.

12. Scopolamine dilates the pupil, paralyzes the accommodation, and contracts the vessels of the iris and ocular conjunctiva. If the preparation is pure, it has, as stated, five times the effect of a similar quantity of atropine, and its use is followed by none of the evil sequelæ of that drug, and is therefore destined to play an important role in ophthalmology.—Nat. Drug., 1893, 145.

SOPHORINE.

Sophorine.—This alkaloid, obtained from different species of Sophora, was obtained by Plugge from the seeds of Sophora tomentosa, L., and proven to be identical with cystisin.—Amer. Drug. and Pharm. Rec., 1894, 32.

SOLNINE.

Solnine.—J. U. Lloyd has investigated the alkaloidal constituent in Solanum carolinense. This was prepared as follows: Percolate the root of the plant with alcohol. Distil the alcohol in the presence of enough water to leave one part of residue in the still after the alcohol is recovered, for every portion of four parts of the drug. Cool the residue, and to it add sulphuric acid in slight excess, and then its bulk of water, and after twenty-four hours filter the supernatant liquid. Evaporate the filtrate to a creamy consistence, make it alkaline with ammonia, and abstract the alkaloid from it by rotations with chloroform. Evaporate the chloroform and abstract the alkaloid from the viscid dark residue by means of dilute sulphuric acid (1 in 50). Filter, make the filtrate alkaline with ammonia, and again abstract by chloroformic rotations. Repeat this operation until the material that is carried forward is soluble in both chloroform and diluted sulphuric acid. It is still of a dark color. When this point is reached, evaporate the chloroform solution, and when the residue becomes of a viscid condition abstract it with boiling sulphuric acid ether, U. S. P., 1890. Decant the ether and continue the abstraction of the residue with successive portions of boiling ether until it is exhausted. Evaporate the mixed ethereal solutions, which will yield the alkaloid in yellowish minute crystals. Purify by solution and crystallization from boiling anhydrous alcohol, when the alkaloid will be obtained pure and colorless.*

Properties.—This alkaloid, to which the author has affixed the name solnine, is in the form of white, brilliant crystals, and is practically insoluble in water and dilute ammonia. It dissolves freely in all the diluted sour acids, forming very soluble salts, that are acrid and bitter, leaving a persistent tingling sensation on the tongue. The salts have not yet been crystallized. It is very soluble in cold chloroform and in boiling alcohol; from the latter it separates on cooling in large needle-like crystals resembling hydrastine; from the ether by evaporation it remains as a glassy residue. It is precipitated in minute crystals from alcoholic solution by the addition of water. It yields ammonia on heating with caustic potash. As a summary it may be said that the author's work supports the experimental announcement of G A. Krauss (see Proc., 1891–92) and that it demonstrates that this plant must be placed with the alkaloid-bearing drugs. The figures of the crystals convey for the first time in print the appearance of crystals of ordinary size. The author concludes with reference to the drug.—Am. Jour. Pharm., 1894, 161.

SPASMOTIN.

Spasmotin.—(Sphacelotoxin.) A poisonous element of ergot recently isolated in a pure state by Jacobi. It has been named "Spasmotin," owing to its causing spasms of the small arteries, and like ergot itself, it is said to stimulate the pregnant uterus. The method of obtaining spasmotin is based on its solubility in ether and its insolubility in petroleum ether. The spasmotin is extracted from ergot direct by ether and precipitated by addition of petroleum ether; or the oil contained in ergot is first removed by extraction, and spasmotin extracted by ether from the ergot. In the pure state, it is described as a yellow, amorphous powder, insoluble in water, in diluted acids and petroleum ether, but very easily soluble in ether and in alcohol, acetic ether and benzene. Spasmotin forms salts with alkalies, and may again be precipitated by carbonic acid. From benzene it may be obtained in crystals. The formula $C_{20}H_{21}O_9$ has been assigned to it. The pharmacological effects of the ergot are said to be inherent in spasmotin and its sodium salt. The latter is suitable also for subcutaneous application, as it does not, it is stated, produce local disturbance. According to Freund, spasmotin yields the same effects as are obtained with ergot. The doses employed in satisfactory experiments so far, have ranged from 4 to 8 Cgms; doses up to 1 Gm. (?) have been given without inconvenience.—Ther. Monatsh., 1894, No. 5.

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*This method is the process of discovery, circuitous as compared with methods that can be evolved now that the alkaloidal character has been established.

STRYCHNINE.

Strychnine Nitrate.—The product obtained by dissolving strychnine in cold or warm dilute nitric acid, and evaporating the solution, is invariably colored; if, however, according to Guigues, (Jour. Chem. Soc., 1894, 262), the alkaloid is suspended in hot water, and dilute nitric acid (1 : 5) added drop by drop until the liquid is neutral and dissolution complete, a colorless product is obtained on evaporation. The crystals are anhydrous. Brucine nitrate remains in the mother liquor.

Differentiation of Strychnine and Brucine.—Beckurts states that, in experimenting to determine the extent to which brucine interferes with the detection of strychnine in the sulphuric acid and potassium dichromate reaction, he has found that where brucine is largely in excess (say 20 parts of brucine to 1 part of strychnine) the reaction is very distinct. Where, however, the brucine is in excess of only 2 parts to 1 part of strychnine the reaction is feeble and indistinct.—Archiv. der Pharm., 1893.

Value of Vitali's Reaction with Strychnine.—G. P. Menegaggi (Boll. Chim. Farm., 1894, No. 4), has found that strychnine alone in solutions containing 0.0001 Gm. of the alkaloid gives to Vitali's test a light violet coloration. This is only perceptibte when a 4 per cent. freshly prepared and colorless alcoholic solution of potassa is used.

In judicial testimony physiological experiments are not admissible, and Vitali's atropine reaction within certain limits and in the presence of strychnine suffers a disturbance. For pharmaceutical purposes, however, it hardly loses its value, as it is hardly probable that the color reaction of atropine is likely to be confounded with strychnine.

SYNANTHRIN.

Synanthrin.—This was separated from Jerusalem artichoke and is a white, amorphous, nearly insipid substance. It is soluble in all proportions of water and dilute alcohol, less soluble in concentrated alcohol. It fuses at 170° C. and shows the rotation $a_D = -17°$; its composition corresponds to the formula $8(C_{12}H_{10}O_{10})H_2O_2$. It does not reduce Fehling's solution, and has the peculiar property of preventing the formation of saccharate of baryta from cane-sugar and boiling baryta, unless the proportion of sugar present is greater than 1.5 to 1 part of synanthrin.—Jour. Pharm. Chim., 1893, 107.

STROPHANTHIN.

Tannate of Strophanthin.—Merck (Jahresber., 1893) says this body is a yellowish amorphous powder, soluble in alcohol, containing 58.14 per cent. of strophanthin. It is indicated in the same cases as the pure glucoside, and is convenient for use in the form of pills.

TOBACCO ALKALOIDS.

Tobacco Alkaloids.—A. Pinner refers to the constitution of nicotine, which he has long regarded as of a nitrite nature, and not, as Etard thinks, a benzoyl derivative. In this connection he speaks of a secondary base —$C_{10}H_{14}O_2$—which he calls metanicotine. It is a liquid which boils at 275° C., volatilizes with difficulty on a water bath, is optically inactive, and the alkaline solution yields, on the addition of benzoyl chloride, a benzoyl derivative. From this and other reactions Pinner is forced to agree with Etard's view of the constitution of nicotine.—Chem. and Drug., 1894, 858.

Industrial Manufacture of Products Rich in Nicotine.—Th. Schloesing, Jun.—Extracts of tobacco can be successfully applied for combating epidemic parasites both on plants and animals. In the La Plata country liquids are used containing at most 200 Gm. nicotine per litre. This liquid for application to animals is diluted with 80 vols. of water. For plants solutions of nicotine at $\frac{1}{1000}$ are very suitable.—Compt. Rend., cxviii., 19.

Benzoylnicotine.—Described by Etard (Compt. Rend., 1893; No. 117) as a colorless and slightly viscid alkaloid, having no tendency to crystallize. It is insoluble in water and dissolves only in an excess of dilute hydrochloric acid. Its chloroplatinate is a light-yellow crystalline precipitate of the composition $(C_{10}H_{13}N[C_7H_5O]HCl)_2PtCl_4$.—Therapeutic data are yet wanting.

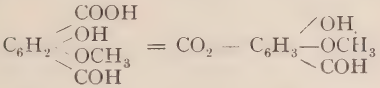
TRIGONELLINE.

Trigonelline.—The seeds of Pisum sativum and Cannabis sativa contain, besides choline, an alkaloid, which is identical with trigonelline, a base obtained from Trigonella fœnumgrœcum; the identity of the two substances is shown by the analysis and properties of the two aurochlorides, $C_7H_7NO_2HAuCl_4$ and $(C_7H_7NO_2)_4 3HAuCl_4$. Hantzsch has shown that trigonelline is the methyl-betain compound of nicotinic acid (Schulze and Frankfurt Bericht, xxvii., 769).—Pharm. Jour. Trans., 1894, 1006.

VANILLIN.

Vanillin, or a substance much resembling it, has been found in the alcoholic extract obtained from Botany Bay gum (Xanthorrhœa hastillis) as has also benzoic, cinnamic, and paracoumaric acids. Vanillin has been identified in the extract prepared from another species of Xanthorrhœa (X. australis).—Jour. Chem. Soc., 1894, 47.

——— Von Heyden has patented a new process in which aldehyde-guaiacol carboxylic acid or its silver salt is heated in presence of acidulated water to temperature of 180° C. under pressure, whereby carbonic acid gas is split off, yielding aldehyde-guaiacol or vanillin, thus :



$$C_6H_2\left\{\begin{array}{l}COOH\\ OH\\ OCH_3\\ COH\end{array}\right. = CO_2 - C_6H_3\left\{\begin{array}{l}OH\\ OCH_3\\ COH\end{array}\right.$$

—Alumni Jour., 1894, 66.

Vanillin From Cloves.—Jorissen and E. Hairs (Bull. de l'assoc. Belge des Chim. ; through Bull. de pharm. de Bruxelles, xxxvii., 231) noting the similarity in composition between vanillin and eugenol, have examined cloves and the essential oil obtained from them to ascertain whether vanillin was one of their constituents. An ethereal tincture of cloves was prepared and treated with solution of sodium acid sulphite. This solution, being separated, was then treated with a mineral acid and the sulphurous acid thus liberated removed, after which the mixture was agitated with ether. This, on being separated and evaporated, left a residue which gave off a strong odor of vanilla. A similar crystalline residue was obtained on subjecting oil of cloves to the same treatment. The crystals were soluble in water, especially when warm, also in alcohol and ether. They were colored by ferric chloride, began to melt at 79° C., and sublimed readily. The yield was very small, so that an extended examination was not possible, but the investigators consider that the physical and chemical characters of the product, so far as they have been ascertained, indicate its identity with vanillin.

VERATRINE.

Reaction for Veratrine.—N. Wender uses two or three drops of a mixture of sulphuric acid and furfuraldehyde (five drops to ten C.c. acid). This mixture by means of a glass rod is applied to a minute particle of the alkaloid, when a yellowish-green and then an olive-green mixture results ; the edges and the whole of the mixture afterwards turn to a beautiful blue color. On warming the mixture gradually acquires a purple-violet color. The blue substance obtained in the cold is insoluble in alcohol, ether or chloroform. The least amount of water, or alkali, decolorizes the solution, and on adding much water a fairly permanent-yellow solution is obtained.—Chem. Zeit., 1893, 950.

OILS (ETHEREAL).

Essential Oils—The Botany and Chemistry of.—H. A. D. Jowett concludes that botanically the oils are found in vessels or cavities of protogenetic or hysterogenetic origin, and are produced by the protoplasm, probably as by-products in the elaboration of the food material of the plant. And chemically the constituents of most oils are terpenes of $(C_5H_8)_n$ mixed with the substance to which the odor is due, which may be alcohol, ketone, aldehyde, alkyl salt or phenol derivative. In many cases alkyl salts are present, and to them very often the odor is due, but it is to be hoped that a thorough investigation will be made into the constituents of the oils.—Pharm. Jour. Trans., 1893, 6.

Ethereal Oils—Analysis of.—R. Benedikt and H. Strache. As an aid in the identification of ethereal oils, the authors have determined the "carbonyl number" ("carbonylzahl") for many of these, that is, the amount of carbonyl oxygen in 1000 parts of the oil. The value of this co-efficient varies from 0.9 in the case of oil of cedar-wood to 145.3 in the case of oil of bitter almonds; it has been determined for a number of different oils and their commercial varieties, but the table of results is too long to reproduce. The method adopted is to boil a weighed quantity of the oil with phenylhydrazine hydrochloride (the relative amounts varying as the oil contains more or less carbonyl oxygen) and sodium acetate in amount equal to 1½ times that of the hydro-chloride for a quarter of an hour in alcoholic solution. The whole is then made up to 100 C.c., the hydrazone and unattacked oil filtered off through a dry folded filter, and the excess of phenylhydrazine determined by oxidizing 50 C.c. of the filtrate with hot Fehling's solution, and measuring the nitrogen evolved. An improved method of measuring the nitrogen is described.—Monatsh., 1893, 270; Jour. Chem. Soc. (Abs.), 1893, 560.

Constituents of Essential Oils.—Schimmel & Co. (Bericht., April, 1894), find that borneol exists in citronella oil to the extent of 1 to 2 per cent. Steam-distilled bergamot oil they state to be inferior to expressed, on account of the decomposition of its chief ingredient, linalyl acetate, which is very unstable, in the process of distillation. Genuine lemon oils, possessing a somewhat lower rotatory power than +60°, may possibly be produced, and from the fruit of "Limoni bastardoni," there has been produced an oil with optical rotation of +58°20′. When below +60°, however, oils are usually either adulterated or of low quality. Indian grass oil has been met with containing as much as 50 per cent. of fixed oils as adulterants. Oil of ginger appears to contain camphene and, in a fraction distilling over at 170° C., phellandrene was found. It is suggested that pure distillates of lavender oil should have specific gravity 0.883 to 0.890, at 15°, and optical rotation varying from —5° to —8° C., in 100 Mm. tube. One part by volume should dissolve in three parts by volume of 70 per cent. alcohol, and the ester proportion should be 30 to 40 per cent. The finest perfume in lavender oils is found to be invariably associated with the highest ester percentage. American peppermint oil has, so far, been found to contain acetaldehyde, iso-valeraldehyde, iso-valerianic acid (free and as ester), pinene, phellandrene, cineol, limonene, menthone, menthol, cadinene, and a solid body ($C_{10}H_{16}O_2$, with m. p. 23° C.), which is the lactone of an oxy-acid melting at 93° C. Menthene has not as yet been detected in the oil. The "rhodinol" of Eckart, Barbier, and Monnet is proved to be non-existent, the fractions of rose and geranium oils so-called, consisting for the greater part of geraniol, with a small proportion of a body smelling like honey, and as yet unexamined. Barbier's "licarhodol" is also identical with geraniol. G. M. Beringer's objection to the incorporation of pure methyl salicylate (wintergreen oil) in the new U. S. P., on the ground that being a chemical product, it is liable to be adulterated with other synthetic bodies, is held to be quite unjustified by facts.

Odors of Volatile Oils.—The tendency of the results of recent investigations is to show that, instead of the characteristic odor of an essential oil being invariably due to one single principal constituent, the other bodies present have also a distinct value in determining the odor. In addition to volatile oils of which the odor is simple in character, there are others in which several odoriferous bodies combine to produce the characteristic odor. Thus, the oils of caraway, anise, and linaloe are examples of those in which the aroma is due to a single odorous body—carvol, anethol, or linalool—the determination of which suffices as a test of their value and purity; whereas the conditions are more complex in the case of the oils of cassia and cinnamon. The odor of cinnamic aldehyde, the chief constituent of cassia oil, is adversely affected by the presence in the oil of cinnamyl acetate, in greater or less proportion; whilst in Ceylon cinnamon oil, eugenol, phellandrene, and small quantities of other compounds not as yet identified, affect the odor of the aldehyde beneficially. Though, therefore, the value of cassia oil may be directly estimated by quantitatively determining the amount of aldehyde contained in it, the same process is not applicable to cinnamon oil, in the case of which the percentage of this ingredient is only one factor in the valuation of the article. Still more complicated conditions exist in the cases of lavender, bergamot, neroli, and petitgrain oils; and rose oil affords a striking example of the important influence which combinations of odoriferous bodies sometimes exercise on the perfume. The oils of rose, geranium, and palmarosa contain approximately the same percentage (80 to 90) of geraniol, which is identical in the three oils. Whilst, however, the last two oils are valued in proportion to the amount of geraniol they contain, the value of rose oil depends upon the various other bodies present, the investigation of which will be necessary before a scientific basis can be found for the chemical examination of rose oil.—Schimmel's Bericht, April, 1894.

Terpeneless Volatile Oils.—V. Coblentz. The older method of the classification of the volatile oils into those containing oxygen, and those free from this has been dropped, since many of those oils which were formerly looked upon as being free from oxygen are now found to contain this, in the residual portions. The author reviews the history connected with the examination of ethereal oils for steroptens, and gives the following table of the comparative strength of terpeneless oils to other oils:

	Comparative strength to other oils.
Terpeneless oils of angelica, lemon, orange	30 x
“ oil of juniper berries	20 x
“ “ calamus	8 x
“ “ wormwood	10 x
“ “ coriander seed	6 x
“ “ thyme	5 x
“ oils of cumin, laurel, mace, rosemary	4 x
“ “ anise, bergamot, caraway, cassia, clove, fennel, lavender, lemon-grass, peppermint, pimenta, sassafras	2 to 2½ x

—Alumni Jour., 1894, 81.

Aerial Oxidation of Terpenes and Essential Oils.—Kinzett reviews his previously published investigations and gives the results of a further lengthened inquiry concerning the limited oxidation of American, Russian and French oils of turpentine, as also camphor oil and oil of eucalyptus. All essential oils containing terpenes yield upon oxidation with air (with or without the presence of water) an organic peroxide, which is held in solution in the oxidized oil. This so-called camphoric peroxide, which has not yet been isolated, suffers chemical change by contact with water, and peroxide of hydrogen is always produced therefrom, so that when the process of oxidation takes place in the presence of water, not only is the oil oxidized, but peroxide of hydrogen is found present in the aqueous solution, accompanied by at least two other compounds, one of which has the composition corresponding to the chemical formula $C_{10}H_{16}O_3$, whilst the other resembles thymol ($C_{10}H_{14}O$) in composition and some properties. It has not, however, been obtained in solid form, but only as an oily body. The author is still in doubt whether the body $C_{10}H_{16}O_3$, and the H_2O_2 are produced by one and the same chemical change. Cymene is obtained from the body $C_{10}H_{16}O_3$ by distillation of an aqueous solution, admixed with dilute sulphuric acid. The body $C_{10}H_{16}O_3$ has some powers of loose combination and is somewhat unstable; its aqueous solutions when heated give evidence of decomposition (by hydration and dehydration). The oxidized oils yield from 40 to 50 per cent. of solid residue when evaporated at 100° C., and the resulting substance upon analysis corresponds in composition with the empirical formula, $C_{10}H_{14}O_2$. When this body is digested with water, a substance passes into solution which may be a hydrate, as its composition approximates fairly close with the formula $C_{10}H_{16}O_3$. This last named substance is, however, sweet to the taste, whereas the body of the same composition, prepared as previously referred to, is very bitter; hence the author is not satisfied of their identity. If instead of evaporating the oxidized oils in open vessels they be distilled at 60° C. or 100° C., there can be isolated at certain stages of the process (after the unoxidized and unaltered hydrocarbons have passed over) small amounts of two substances, one of which apparently corresponds in composition to sobrerone, $C_{10}H_{16}O$, and the other of which appears to be $C_{10}H_{16}O_2$.—Drug. Circ., 1894, 84.

Extraction of Volatile Oils from Flowers.—This is effected by G. Morpurgo, by arranging a series of boxes containing the odorous material, which are alternately connected with Woulff's bottles partly filled with a purified vaseline oil. By means of an air-pump, air is first purified by passing it through an alkaline solution of pyrogallol (this solution absorbs part of the atmospheric oxygen, and the resulting mixture of nitrogen and oxygen has been found to exert very little effect in altering the oils, thus it was possible by this method to extract the oils from violets, which could not be done by simply using air), and then it enters the bottom of the box filled with the material, and, becoming charged with the vapor of the essential oil, escapes above, and passes into the Woulff's bottle, giving up the essential oil vapor to the mineral oil; the air then enters a second box, etc. The material, after wilting, is removed and replaced by fresh; the mineral oil afterwards is made to give up the essential oil to deodorized alcohol. By spraying some of the flowers with alcohol the extraction was greatly facilitated; in some cases, as in tuberoses, heliotrope, etc, this procedure on the contrary is detrimental.—Pharm. Post, 1893, 405.

Sodium Salicylate in Oil Distillation.—W. Lenz, (Zeitschr. f. anal. Chem., xxxiii., 193), finds that by using, instead of water, a 50 per cent. solution of sodium salicylate to moisten powdered cloves before distillation, the yield of oil is increased on the average by 1.7 per cent. and the eugenol by 2 per cent.; the same result was obtained with mace.

Essential Oils in Alcohol.—The presence of essential oils in solution in alcohol is determined qualitatively, by Bardy and Bérard (Jour. Pharm. Chim., 1893, 458), by adding to 1 C.c. of the alcohol, 25 C.c. of distilled water, then 1 C.c. of permanganate solution (1 Gm. per litre). If the color does not alter appreciably, only traces of oil are present. If, however, there is a decided change to maroon or yellow, then to 5 C.c. of the spirit add 30 to 35 C.c. of brine colored with a little aniline violet. An oily layer of a violet tint may now rise to the surface, and in that case, by operating upon a larger quantity of the alcohol in a similar way, but without the aniline violet, an appreciable quantity of oil will be separated and its amount may then be determined. The essential oil remaining in solution in the alcohol may be determined quantitatively by a further process, which must also be employed in the case of specimens from which no oily layer separates. This method consists essentially in the separation of the oils by means of carbon bisulphide and their conversion by the action of sulphuric acid and sodium acetate into the acetates of higher alcohols, the amounts of which are then determined and will indicate the percentage of essential oil dissolved in the alcohol under examination.—See also Rép. de Pharm., 1893, 350.

Ethereal Oils in Water.—F. Ranwez offers the following process for determining the ethereal oils in waters: Dissolve common salt in the water to be tested; shake up with ether; withdraw water from the ethereal extracts with calcium chloride, and then evaporate the former with a weighed quantity of olive oil.—Pharm. Zeit., 1894.

Methyl Number in Ethereal Oils.—H. Grussner. A method by Benedict and Grussner for determining the so-called "methyl figure" in ethereal oils.—Zeitschr. Oest. Apoth.-Ver., 1893, 460. (Illustration.)

Technical Analysis of Ethereal Oils.—Quantitative analysis. J. Klimont, in Chem. Zeit., 1893, 641 and 672. The author gives an extensive table on the terebene number of a large number of ethereal oils.

The Industry of Ethereal Oils and Allied Products.—F. A. Flückiger in an introduction to the work issued by Schimmel and Co.—Reprinted in Pharm. Rund., 1894, 42, 71, 91.

Ethereal Oils.—A review of the most recent work on commercial ethereal oils, patented products and researches of a scientific character.—W. Kerp, in Chem. Zeit., 1893, 1132.

New Essential Oils— *Glechoma hederacea*, L. (Ground Ivy) yields 0.03 per cent. of an essential oil; the sp. gr. is 0.925 at 15° C.; the odor is disagreeable and color is dark green. *Apium petroselinum*, L. (Parsley root) yields 0.08 per cent. of an oil; the sp. gr. is 1.049 and separates crystals (probably of apiol), even at the ordinary temperature. *Essential Oil of Mignonette Roots* possesses characteristics which denote that it belongs to the mustard oil group—it being, however, only an analogue. Its constitution will be determined by subsequent experiments. (*Asarum canadense*, L. (Canada snake root), the rhizome yields an oil soluble in twice its volume of 70 per cent. alcohol.) *Chenopodium ambrosioides*, L. *var. anthelminticum*, *Gray* (American wormseed), the fruit yields 1.03 per cent. of a bright yellow oil, sp. gr. 0.910 at 15° C., with optical rotation, 18° 55′ in a 100 Mm. tube. The inference is that limonene is present. The oil from the herb (0.35 per cent.) is very similar but possesses a sp. gr. of 0.879 and optical rotation —32° 55′. Neither of these oils gives a perfectly clear solution with 10 times its volume of 70 per cent. alcohol, but age probably modifies them in this respect. Oil of *Solidago canadensis*, L. (0.63 per cent.) is light yellow in color and possesses an agreeable odor; sp. gr. 0.859 and optical rotation — 10° 10′. *Juniperus virginiana*, L.; the leaves yield 0.2 per cent. of a pale greenish-yellow oil with an orange-like odor, quite distinct from that of savin; sp. gr., 0.886, optical rotation —59° 5′.—Semi-Annual Report of Schimmel & Co., April, 1894.

Oil of Dittany.—(From *Cunila Mariana*, L. (Nat. Ord. Labiatæ.) The yield of this oil from the dry herb was 0.7 per cent. It is of a yellowish-red color, has a sp. gr. of 0.915 at 15° C., and possesses a strong thyme-like odor. A preliminary experiment has indeed indicated it to contain no less than 40 per cent. of a phenol, which is most probably thymol. The oil is distinguished from the two following by not being soluble in 70 per cent. alcohol. It gives but a very faint greenish color with ferric chloride. As thymol gives no color reaction with ferric chloride, but only its sulphonic acids or their salts, it is probable that it is accompanied in the oil by small amounts of another phenol.

Oil of Mountain Mint.—This oil is distilled from *Pycnanthemum incanum*, Michaux (Nat. Ord. Labiatæ). The yield of oil from the dry herb was 0.98 per cent. It is of a pale yellowish-red color, has a sp. gr. of 0.935 at 15° C., and forms a clear solution with twice its volume of 70 per cent. alcohol. It also gives with ferric chloride a slight greenish color, changing to brown.

Oil of Wild Mint.—(From *Mentha Canadensis* L. (Nat. Ord. Labiatæ.) The yield of this oil from the dry herb was 1.23 per cent. It is of a reddish-yellow color, has a strong odor reminding of pennyroyal, and the sp. gr. 0.943 at 15° C. It forms a clear solution with twice its volume of 70 per cent. alcohol, and gives with ferric chloride a greenish color, changing to brown.—Ibid., Oct., 1893.

Adulterated Oils in American Commerce.—Schimmel & Co. (Semi-Annual Report, Oct., 1893) report the following:

Oil of Bitter Almonds.—A sample of this oil, manufactured in Paris, and designated as "Essence surfine d'amandes amères," proved to be artificial oil, and contained a notable amount of chlorine compounds.

Oil of Ambrette Seed.—The true characters of this oil have previously been referred to (see Schimmel & Co's. Report, April, 1888, pages 29 and 47). A sample from a New York firm, who state in their price list that their oil "is not a combination with oil of orris, as is the habit of some foreign manufacturers," was found to remain absolutely clear and liquid at a temperature of —5° C., while the true oil solidifies at +10° C. The odor also plainly discloses the presence of copaiva oil.

Oil of Chenopodium or American Wormseed (From *Chenopodium anthelminticum*, L.)—Some samples of this oil from reliable sources have a sp. gr. of 0.970 at 15° C., and form a clear solution with ten times their volume of 70 per cent. alcohol. These requirements have been adopted by the new U. S. Pharmacopœia. Some other commercial samples of this oil had a sp. gr. of 0.0955 and 0.963 at 15° C., and did not form a clear solution with above amount of 70 per cent. alcohol. They were evidently adulterated with oil of turpentine, which could also be recognized by the odor.

Oil of Coriander.—The specific gravity of pure oil of coriander appears to vary, according to its origin, between the limits of 0.874 to 0.882. An excellent indication of its purity, which seems not to have been as yet recorded, but which has been adopted by the U. S. Pharmacopœia, is the fact that it affords a perfectly clear solution with three times its volume of 70 per cent. alcohol. One sample of this oil had a sp. gr. of 0.890 at 15° C., and was insoluble in 70 per cent. alcohol. Another sample had a sp. gr. of 0.886, and was likewise insoluble in 70 per cent. alcohol. Both of these oils were therefore to be regarded as adulterated.

Oil of Lemon.—Since the adoption of the physical standards (optical rotation and specific gravity) for a pure and normal oil of lemon, they have received samples answering these requirements. Fraud in this oil has not entirely ceased, however. A sample of oil which had been sold at the enormous price of $7.50 per pound, with the special recommendation that it would not become rancid, had the following characters: Spec. gr. 0.855 at 15° C. Opt. rot. + 59° 15′ in a 100 Mm. tube. It was at first considered possible that the oil might have been increased in strength by the addition of citral, for this being quite inactive optically would reduce the rotation. On the other hand, as we find the specific gravity of citral to be about 0.900 at 15° C., it was evident that no additional amount of this could be present, as otherwise the specific gravity would be higher than that of a normal oil. It would, therefore, have to be regarded as adulterated, even if sold at the ordinary price of pure lemon oil.

Oil of American Pennyroyal (*Hedeoma pulegioides*, Persoon).—A portion of the dried herb consisting almost entirely of leaves yielded 2.94 per cent. of a dark reddish colored oil, which when rectified with water was obtained of a pale yellow color. Another portion of dried herb consisting of leaves and stems yielded but 1.3 per cent. of oil. The crude oil has a sp. gr. of 0.933 at 15° C., and when rectified 0.932 at 15° C. One volume of the oil forms a perfectly clear solution with two volumes or more of 70 per cent. alcohol. This test, which is particularly important for the detection of adulterations with oil of turpentine, has been adopted by the new U. S. Pharmacopœia. On subjecting a small portion of the oil to fractional distillation, the following fractions were obtained :

I.	Below 210° C.	only a few drops.
II.	210–220° C.	24 per cent.
III.	220–223° C.	30 "
IV.	223–225° C.	26 "
V.	225–230° C.	10 "
VI.	Residue	10 "
		100 per cent.

All of the above fractions formed clear solutions with 70 per cent. alcohol. By further fractionation their boiling points and relative proportions would naturally change. A chemical study of the oil of American pennyroyal has already been made by Kremers (Proc., 1887, 546–561), and the oil of European pennyroyal (from Mentha pulegium, L.), has been carefully investigated by Pleissner, (Ann. der Chemie, 272, 1–37) and Wallach (Ann. der Chemie, 272, 122).

One of the oils examined had a sp. gr. of 0.890 at 15° C., and was not soluble in 70 per cent. alcohol. Another specimen had a sp. gr. of 0.895 at 15° C., and was likewise insoluble in 70 per cent. alcohol. It was evident that both of these oils were considerably adulterated with oil of turpentine.

Oil of Rue (Oleum Rutæ).—In the report of Schimmel & Co., April, 1892, 31, it is stated that "our German distillate, which is the choicest oil obtainable, consists for the most part (about 90 per cent.) of methylnonylketone, and solidifies even at a moderate temperature to a solid crystalline mass." As a basis for the comparison of other oils the following observations may be noted : A pure German oil has the sp. gr. of 0.837 at 15° C. Schimmel & Co. have previously observed the sp. gr. of 0.835 and 0.838 for Spanish oils. Pure methyl-nonyl-ketone $CH_3—CO—C_9H_{19}$ is stated to have a sp. gr. of 0.8205 at 17.5° C. We find the optical rotation of the oil to be very slight, and, although too dark in color to be observed accurately, it is apparently about + 1° in a 100 Mm. tube. It solidifies readily to a crystalline mass at 0° C. It begins to boil at 215° C., and distils completely at 232° C. The pure ketone boils at 225° C.

One sample of oil of rue, labeled " Oil Rhue," had the following characters :

Sp. gr. 0.870 at 15° C. Opt. rot. —25° in a 100 Mm. tube.
It does not solidify in a freezing mixture at —18° C.

By fractional distillation the following fractions were obtained :

155–162° C.	40 per cent.	(at 160° C. quite constant)
162–167° C.	23 " "	
167–205° C.	25 " "	
Residue	12 " "	
	100 per cent.	

The first two fractions consisted chiefly of pinene, as indicated by the boiling point and the nitros-chloride reaction. The residue (12 per cent.) contained some ketone. These results clearly indicate that this so-called "Oil Rhue" contains at least 90 per cent. of oil of turpentine.

Another commercial specimen of oil of rue had the following characters:

Sp. gr. 0.620 at 15° C.
Opt. rot. —3° in a 100 Mm. tube.

On cooling it separated in two distinct layers. By fractional distillation it was found to have approximately the following composition:

45 per cent.	alcohol.
30 " "	oil of turpentine or a similar body.
25 " "	oil of rue.
100 per cent.	

Oil of Spike Lavender.—According to previous observations (see Schimmel & Co's. Report, October, 1891, p. 35) the specific gravity of this oil should be above 0.900 at 15° C., and it should form a clear solution with three times its volume of 70 per cent. alcohol. One specimen of this oil had a sp. gr. of 0.897 at 15° C., and was insoluble in 70 per cent. alcohol. It was accordingly declared adulterated.

Oil of Tansy.—Although this oil is not at present recognized by either the United States or the German Pharmacopœia, it is nevertheless of some importance. An excellent test for the purity of this oil, which appears not to have been previously noted, is its solubility in 70 per cent. alcohol. Thus an oil of undoubted purity we find to have a sp. gr. of 0.926 at 15° C., and to form a perfectly clear solution with three times its volume of 70 per cent. alcohol. Schimmel & Co. have previously observed the sp. gr. of 0.927 for French oil and 0.930 for German oil. A commercial sample had a sp. gr. of 0.919 at 15° C., was not soluble in 70 per cent. alcohol, and must, therefore, be regarded as adulterated. As a provisional standard for the purity of this oil it would seem justifiable to require that, in connection with the solubility test mentioned, it should have a specific gravity not lower than 0.925.

Bitter Almond Oil—Artificial.—It is stated that the belief that benzaldehyde is quite innocuous, and might therefore be used without hesitation for alimentary purposes, has been disproved by R. Kobert. In large doses it is said to exercise a powerful action upon the nervous system, but it differs from nitrobenzol in being without action upon the blood.—Schimmel's Report, Oct., 1893, 6.

Anise—Oils of.—P. W. Squire finds that the temperature at which a sample after freezing becomes completely liquid is the only constant factor in connection with the congelation and liquefaction of anise oils. It is a few degrees higher than the normal solidifying point, and in recent samples may vary from 60° to 68° F. The polarizing rotation of anise oils in a 200 Mm. tube has, in the samples examined, varied between +2½° and —4½°. It is usually a small minus quantity; appears to have no connection with the source of the oil; does not alter in a year; and is greater in the liquid portion of the oil than in the solid. Pure anethol has probably no rotation whatever.

Anethol requires for solution three parts of rectified spirit and 200 parts of proof spirit. As oxidation proceeds, the solubility increases, till the oil mixes with rectified spirit in all proportions and dissolves in about 100 parts of proof spirit. Star anise oil, however, appears to contain a small quantity of some constituent insoluble in proof spirit, as even after warming the solution is slightly turbid.

In the application of Eykmann's test for distinguishing anise from pimpinella oil, it depends upon the production in the latter of a deep-blue color upon the addition of an excess of the reagent.—Pharm. Jour. Trans., 1893, 540.

Oil of Amber—Decoloration of.—A. Jolles distils the oil in a current of steam, and adds to the distillates about 8 per cent. of permanganate of potash, or dichromate of potash, together with the required amount of dilute sulphuric acid. The oil is then separated and dehydrated by addition of common salt or plaster of Paris, and finally filtered. In bleaching 7 to 9 per cent. of the oil is lost.—Dingl. Polyt. Jour.; Pharm. Jour. Trans., 1893, 362.

Asparagus Oil.—Crouzel (Pharm. Centralh., xxxv., 217) has ascertained that the peculiar odor of the urine after eating asparagus is not due to the presence of asparagin, but to a volatile oil which he has extracted from asparagus, and from urine passed after eating asparagus.

Oil of Bay—Specific Gravity of.—Dodge and Olcott claim that the sp. gr. at 60° F. should be about 0.965.—Drug. Circ., 1893, 139.

——— Schimmel and Co. In the recent revision of the U. S. P., the tests for pure bay oil have been modified in accordance with the results of the most recent investigations. The specific gravity, which was formerly stated to be 1.040, has been reduced to 0.975–0.990, the higher figure having facilitated adulteration with oil of cloves or oil of pimenta. The absence of these adulterations is ascertained further by another test.—Report, Oct., 1893, 6.

Oil of Bay Tests.—Schimmel & Co. do not regard the sulphuric acid test as reliable. Neither do they consider Behringer's statements regarding the solubility of the oil as strictly correct. Some of the oils of their own distillation afford with an equal volume, or with three or four times their volume, of official alcohol a perfectly clear solution, and they have observed the same character with some samples distilled in West Indies. The products of other distillations, on the other hand, will afford with an equal volume or more of alcohol a slightly turbid solution, and it is therefore possible that a pure oil of bay may afford either a clear or a slightly turbid solution with alcohol. This difference in solubility evidently does not depend entirely on the relative amount of eugenol contained in the oil, as might be supposed, for it is possible for oils to yield a clear solution with an equal volume of alcohol or glacial acetic acid, and yet have a lower specific gravity than some yielding a turbid solution, as the following examples which we have noted will indicate:

Specific Gravity.	Solubility in Alcohol.	Solubility in Glacial Acetic Acid.
0.962	turbid.	turbid.
0.965	turbid.	turbid.
0.967	clear.	clear.
0.975	turbid.	turbid.
0.976	turbid.	turbid.
0.979 (West Indian.)	turbid.	turbid.
0.989 (West Indian.)	clear.	clear.
0.982	clear.	clear.
0.984	clear.	clear.
0.986	turbid.	turbid.

Birch Oil.—Hirschsohn. The better qualities possess a sp. gr. at 20° C. of 0.926 to 0.945 and even 0.953 to 0.987. Pure oil on shaking with water (1 : 10) gives a slightly colored and acid solution which, with iron chloride (1 : 1000), is colored green. 5 C.c. of the water mixed with 2 to 3 drops of aniline and 4 to 6 drops hydrochloric acid gives a yellowish colored mixture. That from other tars yields a reddish solution. 1 vol. of birch oil mixed with 20 vol. petroleum benzin gives a yellowish solution which, mixed with a solution of copper acetate (1 : 1000), is not colored green.—Pharm. Post, 1893, 549; from Pharm. Zeitschr. f. Russ., 1894, No. 42.

Caraway Oils.—The investigation of carvol and its derivatives has been continued by Wallach (Lieb. Annalen, 275, 110), who, by oxidation of di-hydro-carveol ($C_{10}H_{18}O$) with chromic acid, has obtained a ketone—di-hydro-carvone, $C_{10}H_{16}O$—which boils at 221°–222°C., and forms a crystalline combination with sodium bisulphite. The odor of this ketone resembles that of menthone and carvol. Di-hydro-carvone is optically active. A change occurs in the rotation in converting the alcohol into ketone, the dextrogyre di-hydro-carveol becoming lævogyre di-hydro-carvone. With hydroxylamine, dextro- and lævo-di-hydro-carvone yield oximes (which affect polarized light in the same way as their respective ketones) of which the melting point is 88°–89° C. On mixing solutions of equal parts of the two active oximes, a new inactive di-hydro-carvoxime, having a melting-point of 115°–118° C., crystallizes out. By boiling di-hydro-carveol with dilute sulphuric acid, terpinene was obtained. Carvoxime heated with the same acid yields carvacrylamine, as well as carvol and carvacrol, and by reducing it with sodium, or by heating carvol with ammonium formate, di-hydro-carvylamine, $C_{10}H_{17}NH_2$, is formed. This base boils at 220° C. and has a sp. gr. of 0.885, a_D 1.48168. Dry distillation of its hydrochlorate causes it to split up into ammonium chloride and terpinene. If the same compound be heated with sodium nitrite solution, nitrogen is evolved, and an oil separates which contains di-hydro-carveol as well as appreciable quantities of dipentene. Baeyer (Berl. Ber., xxvi., 820) has, independently, confirmed several of these results, and, by acting upon the hydrated iodide of di-hydro-carveol acetate with zinc dust, has obtained the tetrahydro-carveol acetate from which the alcohol, $C_{10}H_{20}O$, was prepared by saponification with potash. This alcohol is a viscous liquid of weak odor and cannot be distilled without decomposition. Oxidized with chromic acid, it yielded tetrahydro-carveol (b. p. 220°–223°), which forms with sodium bisulphite a crystalline compound, and with hydroxylamine an oxime, melting at 99°–101° C., which by the action of sodium is re-converted into tetrahydro-carveol. The latter, when heated with dilute hydrobromic acid, is converted into a bromide which yields a hydrocarbon—carvo-menthene, $C_{10}H_{18}$—when boiled with quinoline. Carvo-menthene boils at 175°–176° C., and combines with two atoms of bromine to form a liquid dibromide. The hydrocarbon formed by reducing limonene di-hydrochlorate with zinc dust is believed by Baeyer to be identical with carvo-menthene.—Schimmel's Semi-Annual Rep., 1893, 10.

Cassia Oil.—Cupric oxide, used by E. Hirschsohn in the detection of rosin in oil of cassia, was found to be unreliable as a reagent because of the different conditions followed in its preparation; some specimens would impart to a five per cent. petroleum-ether solution of resin, upon agitation, an immediate intense bluish-green color, other specimens gave no color or only a faint-green after contact for twelve hours. Studying the conditions for the preparation of a reliable cupric oxide, it was found that if one part crystallized copper sulphate, 0.6 part potassium hydrate and 18 parts water be boiled for two hours, an oxide of the greatest activity is obtained; the oxide should be dried at low temperatures and should not be ignited, since this operation will notably decrease the sensitiveness of the oxide.—Pharm. Ztschr. f. Russl., 1893, 705; Amer. Jour. Pharm., 1894, 102.

——— In a note on experiments, Schimmel and Co. say that the origin of the "second quality" cassia oils still remains a mystery.—Report, April, 1894.

Citronella Oil.—The sophistication of this oil in Ceylon is said to have extended remarkably during recent years. The adulterant is usually either a fatty oil (probably cocoa-nut oil) or petroleum. In both cases the admixture can be detected by well shaking one part of the suspected oil with ten parts of alcohol (80 per cent.), when a clear or feebly opalescent solution, not separating on standing, should result if the oil is pure. Either of the adulterants named, if present, will cause the mixture to be quite turbid when shaken, whilst drops of the added oil will separate out after standing for about twelve hours, the fatty oils sinking and the petroleum floating on the surface. In a recent investigation of the terpenes in citronella oil, Schimmel found that a considerable portion of the fraction containing them boils between 157° and 164° C. No pinene could be detected in this portion, but with hydrochloric acid the solid hydrochloride of camphene was obtained. This, when heated with water to 100°, split up into hydrochloric acid and camphene (b. p. 159°–160° C., m. p. +50°). From this camphene a borneol, melting at 212° C., is obtainable. It differs from ordinary borneol, and is considered to be an isomeric compound, being therefore named isoborneol. This may also be obtained from bornyl chloride or from pinene hydrochloride by the same process as employed in the case of camphene. It is suggested that the camphene naturally occurring in citronella oil must be identical with that prepared artificially from borneol. Dipentene was found in the fraction of citronella oil boiling between 173° and 177° C., and the melting point of the tetra-bromide is said to be about 124° C. An alcoholic body, distilling without decomposition between 231° and 232° C., was isolated from the fractions of oil with high boiling points, and identified with geraniol.—Ibid.

Ethereal Oil of Cicuta virosa.—J. Trapp, (Arch. Pharm., 1893, 212), finds that this oil contains cuminol and cymol.

Characters and Tests of Oil of Cloves.—Criticism by F. B. Power upon a paper published in Proc., 1893, 135; Pharm. Rund., 1893, 228.

Castor Oil in Croton Oil and Copaiba.—L. Maupy detects castor oil in croton oil by treating the mixture to dry distillation with an alkali, thus forming sebacic acid and caprylic alcohol from the ricinoleic acid. The sebacic acid obtained by treating the solution with a mineral acid is insoluble in cold but soluble in boiling water. In testing copaiba, ten (10) Gm. of balsam copaiba are carefully heated in a silver capsule with an equal quantity of soda. If, after frothing ceases, an odor of caprylic alcohol is perceivable, the presence of castor oil is certain. If the reaction product is further warmed with 50 C.c. of water, filtered, the filtrate heated in a porcelain vessel with an excess of nitric acid, raised to the boiling point and filtered while still hot, a white precipitate of sebaic acid will subside on cooling, if the supposed admixture was present. This principle is soluble in boiling water, and from this solution is re-precipitated by lead subacetate.—Jour. Pharm. Chim., 1894, 362.

Eucalyptus Oils of Victoria—Preliminary Survey of.—W. P. Wilkinson examined 87 samples of eucalyptus oil, and has determined of all the botanical source, specific rotation, refractive index, specific refractive energy. The only chemical test applied to all of the oils was Cahour's nitrite reaction for phellandrene (Ann. de Chem., 41, p. 76) as modified by Bunge (Zeit. für Chem., 5; Bull. Soc. Chim., 1870, 272) and Wallach and Gildemeister (Ann. der Chem., 246, p. 282).—Aus. Jour. Pharm., 1894, 3.

Eucalyptus Globulus—Oil of.—E. Spizzichino. 50 kilos. of the dried leaves of eucalyptus globulus yield on distillation about 600 Gm. of oil. On prolonged boiling with alcoholic soda, the essence loses its characteristic odor and acquires that of camphor, whilst the soda solution probably retains acetic and valeric acids, resulting from the hydrolysis of some constituents of the essence. The oil, purified by this means, boils principally at 170–180° C., the fraction boiling at 170–175°, when treated with barium oxide and fractionated, gives pure eucalyptol, $C_{10}H_{18}O$, boiling at 171–173° C. It has a camphor-like odor, does not react with phenylhydrazine or hydroxylamine, and is but slightly acted on by sodium.—L'Orosi., 1893, 1.

Eucalyptus—Oil of.—G. Bouchardat and Oliviero. The oil of eucalyptus contains aldehydes—valeraldehyde with a little hexylaldehyde and, in some samples, butaldehyde; alcohols—mainly ethyl and amyl (mostly inactive) alcohols, eucalyptol, and a lævorotatory substance $C_{20}H_{16}$, together with a dextrorotatory substance of higher boiling point. The examination of the latter substances is proceeding.—Bull. Soc. Chim., 1893, 429; Jour. Chem. Soc. (Abs.), 1893, 726.

Eucalyptus Oil—Tests for.—D. B. Dott.—Of the physical tests, density naturally claims attention in the first place. Speaking generally, the oils of low specific gravity are most deficient in eucalyptol, and are more apt to contain phellandrene, and, perhaps, other objectionable constituents. At the same time it would never do to place the specific gravity at too low a figure. Helbing and Passmore suggest .910 to .930. He says .900 to .930. There are some good samples, as sample A in table of specific gravity under .910. .930 appears a little extreme on the other side, as it is a rare thing to get an oil of specific gravity above .920. Yet there is evidently one variety of about .927 sp. gr., so that it is probably desirable to retain the higher limit of .930. Experience seems to show that there is not much to be learned by the use of the polariscope in the examination of eucalyptus oil.

The boiling point of eucalyptol being 174.5° C. (or very near it), and the terpenes present in the oil having lower and higher boiling points, an approximate determination may be made by rectification. By repeated rectification of a considerable quantity of the oil, a fairly accurate result may no doubt be obtained in this way, but such a process would not be suitable as a pharmacopœial test. On distilling, say, 100 C.c. in an ordinary distillation flask, the result differs very sensibly according to the rapidity of the distillation. Neither is the eucalyptol all contained in one fraction, nor does the fraction of ten degrees or even of five degrees above and below 174.5° consist wholly of eucalyptol. For all that, it is the best test practically available. Probably the best fraction to take as representing eucalyptol is that distilling between 170°–180° C.

This has been shown to yield abundance of crystallized eucalyptol when cooled to a low temperature. Davies and Pearmain showed that the fraction 180°–190° did not yield crystals when similarly cooled; there therefore appears no reason for the suggestion of Helbing and Passmore that the fraction 170°–190° should be taken as representing eucalyptol. Indeed, Dott decidedly objects to this proposal, as tending to form a misleading judgment on the relative merits of different oils. A reference to the subjoined table, as also to those given in the papers above referred to, will show that by taking the fraction 170°–190°, an oil may be made to appear as of much higher relative value than by taking the proper fraction 170°–180°. Farther, the author does not think that the suggestion to introduce the freezing-out test is at all practicable. It is extremely difficult in ordinary weather to get the temperature low enough to cause any crystallization of eucalyptol, and equally difficult to determine the exact amount which has so crystallized.

As to the proportion distilling at 170°–180°, which a good oil should yield, the author does not think we would be justified in fixing the minimum at more than 50 per cent.

After what has been demonstrated by Davies and Pearmain, as to the solubility of salicylic acid in mixtures of eucalyptol and terpenes, it seems scarcely worth while to retain the solvent power of the oil on salicylic acid as a test. Miscibility with alcohol is a simpler and equally valuable test. The author has tried some experiments in determining the bromine absorption of different oils, but not sufficient to be able to recommend it as a general test. Broadly speaking, the best oils have least absorptive power for bromine. Iodine absorption is not a convenient process. The nitrous acid and bisulphite tests for phellandrene and aldehydes are no doubt of much importance, although the author has not found any samples which he has examined in recent times to give distinct reactions with either reagent.

Of a large number of samples which he has examined during the past five years, he gives the results of the following six :

	A	B	C	D	E	F
Sp. gr.	.9087	.9115	.9144	.9130	.9123	.9177
100 C.c. of each distilled.						
Below 170°	18.8	33.0	5.0	25.5	17.3	18.6
170°—180°	58.0	57.2	69.0	64.3	59.3	56.9
180°—190°	11.6	5.2	12.6	6.6	13.6	13.9
Above 190°	11.1	4.4	13.3	3.5	9.3	10.5
	99.5	99.8	99.9	99.9	99.5	99.9

—Pharm. Jour. Trans., 1893, 510.

Eucalyptus Oil.—Hirschsohn has discovered a new test for cineol, which appears to be founded upon the formation of a crystalline addition product from cineol and iodol. To about fifteen drops of the oil to be examined, iodol, 0.01 to 0.05 Gm., is added and the mixture shaken. If the iodol does not dissolve, more oil must be added, drop by drop, until a clear solution is obtained. Subsequently, according to the quantity of cineol present, well-defined greyish-green crystals separate from the mixture, either immediately or after some lapse of time. On decanting some of the oil and well washing the crystals with petroleum ether, a little solution of potash poured on the crystals causes an intense odor of cineol to be given off. Schimmel could not detect cineol by this means when less than 5 per cent. was mixed with oil of turpentine, whereas the bromine water reaction indicated as little as 1 per cent., dissolved in limonene.—Schimmel's Semi-Annual Rep., Oct., 1893.

——— *Tests.*—Helbing and Passmore claim that to rely on oils of which 50 per cent. distils between 170° C. and 180° C. is of no avail. Nor do they agree with Dott's statement, that the fractions from 180° to 190° C. do not yield crystallizable eucalyptol when placed in a freezing mixture. They claim that in a good oil, 80 per cent. should distil between 170° and 190° C., and the fractions between 170° and 190° C. should be put into a freezing mixture in order to ascertain the crystallizable eucalyptol therein. Even when the fractional distillation is cautiously carried out, eucalyptol is scarcely found in any fraction under 175° C., the bulk coming over between 175° and 185° C., whilst the fraction 185° to 190° C. nearly corresponds with the fraction 170° to 175° C. in eucalyptol content. They give ample evidence on this point, and append twenty-eight typical analyses, giving the amount of oil and the yield of eucalyptol in the various fractions.—Chem. and Drug., 1893, Dec. 23. (See, also, Ibid., 162.)

Eucalyptus Oil.—A new kind of eucalyptus oil, said to be distilled from the leaves of *Eucalyptus risdonia*, has been imported into London. Samples showed it to have a sp. gr. of 0.915 and an optical rotation, in a

100 Mm. tube, of —4°49′. This oil has a very pleasant, mild odor, and is moderately rich in eucalyptol, in addition to which, however, it also contains phellandrene.—Schimmel and Co., Report, April, 1894.

Oil of Male Fern.—I. Bernhardi finds (Bull. Pharm., 1894, 7) that parts of the root contain ethereal oil—the chaff as well as the fleshy parts. If the ethereal oil is the active principle of the root, the chaff must not be rejected, as has been done in manufacturing the extract, inasmuch as even this chaff may yield an ethereal oil and an ethereal extract. The brown color of the ethereal extract drawn from the distilled material, in comparison with the green color of the extracts obtained from the non-distilled material, is but natural.

——— A. Ehrenberg obtained the following yields of oil from rhizomes collected at different periods; the rhizomes were of recent collection and air-dried; from these, oil was separated by distilling with steam and extracting the oil from the aqueous distillate by the use of ether: April, 0.008 per cent.; June, 0.025 per cent.; September, October and November, 0.04–0.045 per cent. The ethereal oil submitted to R. Kobert for experiment was pronounced by him to be a specific poison for the lower animals, and to be an undoubted factor in the male-fern treatment for tape-worm. A preliminary chemical examination of the oil indicates that it consists of free fatty acids, of which butyric acid predominates; of a number of esters of hexyl and octyl alcohol with the fatty acids, commencing with butyric acid and including pelargonic acid; lastly of small quantities of aromatic bodies. The statement of Kobert that the oleo-resin of Aspidium filix mas, if deprived of the ethereal oil, was of inferior action is also true of the oleo-resin of A. athamanticum.—Arch. der Pharm., 1893, 345, 356.

——— It is described as a yellowish oil of a characteristic odor, resinifying and darkening with age; soluble in ether and in alcohol, but only slightly so in water, and boiling between 160° and 250° C. Kobert's pharmacologic experiments with this ethereal oil have shown that it is a specific poison to the lower animals, and that to it an essential part of the anthelmintic action of male-fern extract is ascribable. On healthy persons, doses of 0.75–1.6 Gm., given in capsules, are said to be perfectly harmless.—Merck's Bericht, 1893, 68.

Fennel Oil.—When fenchone is heated gently with phosphoric anhydride, Wallach (Lieb. Ann., 275, 157) has shown that a cymol is formed, which yields metatoluylic acid (m. p. 110°–111° C.) when oxidized with nitric acid. This fact is said to warrant the conclusion that in fenchocymol and fenchone, methyl- and iso-propyl groups are present in metaposition (1.3).—Schimmel and Co. Report, Oct., 1893.

Fir Oil.—Hirschsohn. The sp. gr. of this oil at 20° C. is 1.02 to 1.15. The watery solution (1 : 10) is colored yellow and is of acid reaction, with iron chloride (1 : 1000) is colored red. 5 C.c. of this water mixed with 2 to 3 drops of aniline and 4–6 drops of hydrochloric acid gives a red colored mixture. In chloroform solution the coloration is intensely red. With petroleum benzine (1 vol. of oil to 20 of benzine) and an equal volume of copper acetate solution (1 : 1000), a green colored solution results. 1 vol. of oil with 9 of alcohol (90 per cent.) gives a clear solution. A cloudy solution indicates kerosene, etc.—Pharm. Post, 1894, 549; from Pharm. Zeitschr. f. Russ., 1894, No. 42.

Gaultheria Oil.—The original oil of wintergreen is said by Schimmel & Co. to have disappeared from commerce altogether. Distillates from Gaultheria procumbens and Betula lenta yielded the following figures:

Plant Used.	Yield of Oil.	Sp. Gr. at 15° C.	Opt. Rot. (100 Mm. Tube.)
Gaultheria procumbens, Dried Leaves.....	0.7 per cent.	1.177	—0° 22′
Betula lenta, Bark............	0.6 " "	1.177	Inactive.

The synthetic product is also optically inactive. All three when pure are said to be almost odorless.—Schimmel & Co., Report, Oct., 1893.

——— *Natural vs. Artificial.*—In a review of the Pharmacopœia in question (Am. Jour. of Pharm., 1893, 600), G. M. Beringer strongly deprecates the introduction of artificial oil of wintergreen into that work. Now the reasons which led to the incorporation of the synthetic oil into the materia medica are so apparent, and have been so thoroughly discusssed, that it is really superfluous to waste words in mentioning them again. Natural commercial wintergreen oil is habitually adulterated in the grossest and most extensive fashion with petroleum, sassafras oil and other oils. Moreover, by far the greater part of the produc tknown in trade as wintergreen oil is not wintergreen oil at all, but the distillate of the bark of a variety of birch (Betula lenta). These facts were doubtless the reason why the authors of the U. S. Phermacopœia decided also to include in their work the artificial methyl-salicylate. Mr. Beringer's objection that methyl-salicylate, being a chemical product, is liable to be adulterated with other synthetic bodies, does not seem to be justified. For the rest, we are of opinion that it is easier to detect adulterations in a uniform chemical body than in an essential oil. This is probably the general view of the matter. —Ibid., April, 1894.

Ginger Oil.—An investigation recently instituted by Schimmel & Co. has revealed the presence of camphene in this oil. It is characterized by the iso-borneol formed by it, having a melting-point of 212° C. Phellandrene was also found in the oil, and the nitrite of phellandrene prepared had a melting-point of 102° C.—Report, Oct., 1893.

Essential Oil of Hops.—A. C. Chapman, having prepared a quantity of this oil by steam distillation, after an interval of ten or eleven months freed it from resin by twice repeating the process, and then found it commenced to boil at 170° C., though the greater part passed over between 230° and 270° C. After several fractionations, about 40 C.c. of oil, boiling between 256° and 261°C., was obtained, and this was found on examination to be a sesquiterpene. Three combustions gave numbers closely agreeing with those required by the formula $C_{15}H_{24}$, and two vapor density determinations by Hofmann's method gave 6.91 and 7.1 respectively, the latter being that required by the above formula. A freshly distilled sample of oil, examined soon after its preparation, boiled at much lower temperatures, and consisted of terpenes of lower boiling point, together with an oxygenated constituent, but contained very little of the sesquiterpene.—Jour. Chem. Soc., 1893, 177.

Lavender Oil.—E. Hirschsohn (Pharm. Zeitschr. f. Russ., 1893) has fractioned a number of vials with the following results :

		1st Distillate.	2d Distillate.	3d, etc., Distillate.	Total.	Solubility in parts of 70 and 80 per cent. alcohol.			
						1st Distillate.		2d Distillate.	
	Brand used.					Pts.	P. c.	Pts.	P. c.
1	Mitch.	26	20	47	93	2.4	70	2	70
2	"	30	20	34	84	8	70	1.8	70
3	Extra.	20	16	38	71	1.8	70	1.6	70
4	Superfine.	30	24	43	97	3.4	80	2.4	70
5	"	20	20	45	85	2.2	70	2	70
6	I.	36	20	39	95	5.6	80	1.8	70
7	Drome.	26	20	43	89	1.2	80	2.4	70
8	Gallic.	30	18	35	93	6	80	2	70
9	M. Blanc.	24	22	43	89	1.5	70	1.8	70
10	Alpes.	18	16	53	87	1.4	80	1	80
11	"	14	14	49	77	1	80	1	80
12	Ordinary.	28	20	51	99	1.4	80	1	80
13	Gallic.	27	26	39	85	3.6	80	2.8	70
14	"	18	18	59	95	1.4	80	3	70

The important point to notice is the ready solubility of the first distillate in 70 per cent. spirit—viz., one part of the oil in 2 to 3 parts of the spirit. The solubility decreases very markedly on the addition of turpentine. Thus 20 per cent. of turpentine added to a pure oil gave a first distillate which was soluble to the extent of 1 in 12 of 70 per cent. alcohol, and 50 per cent. of turpentine reduced the solubility to 1 in 25 of 80 per cent. alcohol. It is also noticeable that most of the turpentine distils in the first fraction.

Lavender Oil.—Since oil of turpentine is a frequent adulterant of this product, Schimmel and Co. have examined genuine lavender oil to ascertain whether pinene is present in it as a natural constituent. It was not traceable in the firm's own distillate, but was found in very small quantity in some French oil. It is suggested that, if a considerable quantity of pinene can be isolated from a sample of lavender oil, the suspicion that the latter has been adulterated with turpentine will be quite justified, especially if the results of the determination of the ester-percentage, specific gravity, optical rotation, and solubility in 70 per cent. alcohol, tend to support the suspicion. Cineol has been found in lavender oil by Hirschsohn, and the fact has been confirmed by Messrs. Schimmel. It is present in very minute proportion, and can only be detected with certainty by first decomposing the linalool also present, by heating with formic acid. The presence of a considerable proportion of cineol is said to indicate adulteration with oil of spike.—Report, Oct., 1893.

Oil of Lemon Grass—Acetone in.—Ph. Barbier and L. Bouveault, in endeavoring to obtain from a large quantity of oil of lemon-grass the citriodoric aldehyde described by F. D. Dodge, succeeded in separating the oil into three portions; one boiling at 65°–75° C., under a pressure of 12 Mm.; another boiling at 110°–115°, constituting the aldehyde; and a third forming a viscid brown liquid. The last portion, generally regarded in commerce as terpene, was specially studied and found, in the case of most lemon-grass oils, to contain, in addition to terpene, a non-saturated acetone combining readily with sodium bisulphite. In one instance the acetone was free from terpene, and, in another, there was very little acetone in oil containing fifty per cent. of terpene. The composition of the acetone is represented as $C_8H_{14}O$, it possesses an agreeable penetrating odor, and boils at 169°–170° C. under the ordinary pressure.—Compt. rend., cxviii., 983.

Oil of Lemon.—V. Oliveri has examined the essential oil of Citrus limonum and describes it, when freshly prepared, as neutral in reaction, not reducing ammoniated silver nitrate, of density 0.86 to 1.60, and having a specific rotatory power varying between $[a]_D = +69.75°$ and 72.10°, at 16° C. It oxidizes in air, becoming faintly acid, and distils entirely with the vapor of water. By fractional distillation the oil was separated into three portions. The first (constituting one-fifteenth of the whole) passed over at 170°–170.5° C., and consisted of limonene, $C_{10}H_{16}$; density at 0° = 0.8867; $[\alpha]_D = +66.82°$ at 16°. It formed a tetrabromide, $C_{10}H_{16}Br_4$, and a dichlorhydrate, $C_{10}H_{18}Cl_2$. The second fraction (nine-tenths of the total amount) distilled at 176°–178° C., and also consisted of limonene; density 0.899; $[\alpha]_D = +76.75°$. The third fraction distilled at 240°–242° C., and is described as sesquilimonene, $C_{15}H_{24}$, a viscid liquid of density 0.9847, optically inactive. This constituted a very small proportion of the oil, and formed an uncrystallizable, oily tetrabromide and a similar dichlorhydrate.—Pharm. Jour. Trans., 1894, 733; from Gaz. Chim. Ital.; through Bull. Soc. Chim. de Paris, 1894, 46.

Oil of Lemon.—R. S. Laddel (Chem. News, 1894, 20). Commercial oil of lemon has a specific gravity of 0.860 at 15° C.; the terpene known as citrene has a specific gravity of 0.850; while the ordinary terpeneless oil of lemon (*i. e.*, freed from citrene) has a specific gravity of 0.900. The ordinary terpeneless oil of lemon is really a mixture of several oxygenated compounds, but by fractional distillation a liquid has been obtained which has a constant composition, an exceedingly strong odor of lemon oil, a specific gravity of 0.962, a boiling-point of 206° C., and a specific rotatory power of $[\alpha]_D = +6.42°$.

The empirical formula corresponds to $C_{10}H_{18}O$ for the true oil of lemon—that is to say, for the terpeneless oil of lemon of constant composition, which appears to be an isomer of borneol.

Compounds of the Citral Series.—F. Tiemann and F. W. Semmler (Ber. d. Chem. Ges., 1893, 2708) describe the citral or geraniol obtained from lemon oil or lemon grass oil as an aldehyde, having the composition $C_{10}H_{16}O$. It is nearly colorless, slightly soluble in water, but readily soluble in alcohol, ether, or chloroform. It is optically inactive. The optically inactive geraniol, $C_{10}H_{18}O$, is the alcohol corresponding to citral, and it is convertible into citral by oxidation with chromic acid, while it can be reproduced from citral by reduction with sodium. Optically active alcohols of the formula $C_{10}H_{18}O$ have been obtained by Eckart and Semmler—rhodinol, feebly lævo-rotatory, from rose oil; coriandrol, a dextro-rotatory unsaturated alcohol, from coriander oil; linalool, aurantiol, and lavendol from bergamot, petitgrain, and lavender oils; also nerolool, the lævo-rotatory unsaturated alcohol from neroli oil. These optically active alcohols of the formula $C_{10}H_{18}O$ all yield citral by careful oxidation. When citral is oxidized, below 0° C. in acetic acid solution, with chromic acid, it yields methyl heptylene ketone and a substituted glyceric acid, chiefly geranic acid, $C_{10}H_{16}O_2$, in the form of a colorless oil, readily soluble in alcohol, ether, benzene, or chloroform. By destructive distillation citral yields carbonic acid and a hydrocarbon, C_9H_{16}, geraniolene, of 0.575 sp. gr. at 20°, boiling at 142°–143° C.

Oleum Macis Expressum.—Hilger (Chem. and Drug., 1893, 576) has recently reported that the fat of Bombay mace prepared by the precipitation method contains no myristic acid. The yellow color, which is readily soluble in alcohol, is only after considerable trouble obtained free from adherent fat and dextrose, and is found to have the characteristics of a quinone. It readily reduces silver-nitrate solution, and this reaction is so characteristic that we can always recognize Bombay mace by it.

Mignonette Oils—Essential oils are yielded both by the flowers and roots of mignonette. The product from the former is of firm consistence, like orris oil, and has the odor of the flowers. The oil from the root contains sulphur and has a radish odor. Root yields 0.035 per cent. oil, sp. gr. 1.085 at 15° C., opt. rot. + 1° 30′ (100 Mm. tube). The dried root is odorless and tasteless.—Schimmel and Co. Report, Oct., 1893.

Niaouli Oil.—G. Bertrand (Bull. Gen. d. Ther., 1893, No. 20) states that niaouli (Melaleuca viridiflora) grows abundantly in New Caledonia. The oil produced by distilling its leaves is of a slightly yellow color and of a strong aromatic odor. Its taste is at first pungent and then refreshing (like our peppermint). The density of this oil was found by the author to be 0.922, and its deviation of a ray of polarized light to be 0.42° to the right. The oil is not affected by litmus; it is insoluble in water and glycerin, but soluble in alcohol, ether or benzin.—See compt. rend., 1893, 1070–1073.

Oil of Peppermint.—Stahre has examined 22 samples, and gives the following figures:

No.	Color.	Specific Gravity.	Residue per cent. at 17°	Index of Refraction.	Rotation.
1	Pale yellow.	.9045	1.3 fluid.	1.462	20° 18′
2	Pale yellow.	.9065	0.1 solid.	1.462	33° 11′
3	Pale yellow.	.91	1.6 ——	1.462	30° 35′
4	Pale yellow.	.906	2.0 fluid.	1.458	28° 26′
5	Yellow.	.917	3.9 solid.	1.467	33° 11′
6	Pale yellow.	.905	0.9 ——	1.459	31° 2′
7	Yellow.	.917	4.6 fluid.	1.467	24°
8	Light yellow.	.909	1.1 solid.	1.463	30° 26′
9	Brown.	.921	4.9 fluid.	1.478	30° 11′
10	Yellow.	.909	1.7 solid.	1.463	27° 19′
11	Brown.	.941	4.2 fluid.	1.479	26° 38′
12	Light yellow.	.914	3.7 solid.	1.466	27° 48′
13	Light yellow.	.91	0.8 solid.	1.462	30° 40′
14	Yellow.	.914	3.3 solid.	1.465	27° 4′
15	Light yellow.	.908	1.6 solid.	1.465	30° 36′
16	Light yellow.	.9065	2.3 fluid.	1.458	28° 36′
17	Light yellow.	.908	0.9 fluid.	1.461	31° 5′
18	Light yellow.	.905	0.3 fluid.	1.458	30° 40′
19	Light yellow.	.9115	2.0 fluid.	1.462	24° 36′
20	Light yellow.	.915	3.9 fluid.	1.465	22° 50′
21	Light yellow.	.912	2.3 solid.	1.463	25° 40′
22	Light yellow.	.913	3.0 semi-solid.	1.462	23° 37′

In Schimmel's report the gravity of the various kinds of oil is given as follows:

Mitcham oil	.905—.910
German oil	.895—.920
French oil	.920
American oil	.910—.920
Japanese oil	.890—.910

All the samples examined fell within these limits, with two exceptions, viz., one was .925, and other .941. Both of these were very dark-colored samples, and generally suspicious. The other 20 samples were looked upon as satisfactory.—Pharm. Zeit., 1893, 214.

Terpeneless Peppermint Oil.—Lupin, of Dorpat, in a dissertation recently published, deals with the effect of "terpeneless" peppermint oil upon the nervous system and the circulatory organs. He points out that the action of such oil, as prepared for him by Heinrich Haensel, indicates that the original oil contains something besides the known stearoptens and elæoptens. This substance, which has not yet been isolated, according to experiments, communicates to the "terpeneless" oil a paralyzing action upon the nervous system, and it is considered that the chemical nature of essential oils is much more complicated and diverse than is yet recognized generally.—Pharm. Jour. Trans., 1893, 111.

American Peppermint Oil.—Quite interesting figures are given in regard to the acreage and product in different localities. In Wayne county, N. Y., the acreage is given as follows: 1076 acres of old plants; 1119 acres of new plants.

The yield is estimated at 8 pounds per acre for the old plants, or 8,608 pounds, and 24 pounds per acre for new plants, or 26,856 pounds, a total of 35,464 pounds for this district. The yield for 1892 for same district is given at 73,782 pounds. The peppermint-producing counties of Michigan are stated to have had a total output for 1893 of about 68,000 pounds, against an output of 98,000 pounds for 1892. The deficiency is said to be due to frosts and grasshoppers.—Schimmel's Report, April, 1894.

Rose oil.—J. Bertram and E. Gildemeister could not isolate any rhodinol from the various commercial geranium oils. A re-investigation of genuine rose oil shows that the geraniol from this source is identical with that from all other known sources. The variation in the sp. gr. of samples of geraniol is attributable to the ease with which the oil oxidizes. A comparison of the properties and behavior of the so-called rhodinol leads to the conclusion that this substance is a mixture consisting, for the most part, of geraniol, just as Barbier's licarhodol is an impure geraniol.—Jour. f. prakt. Chem., 1894, 185.

Bulgarian Rose Oil.—The chief constituent of the elaeopten is roseol, a primary alcohol of the formula $C_{10}H_{20}O$ belonging to the olefine series; its acetate $C_{10}H_{19}C_2H_3O_2$ is a colorless liquid of a different and more agreeable odor than that of oil of rose. The stearopten which, after purification, forms odorless, white crystallized plates, has the formula $C_{16}H_{34}$, melts at 36.5–38° C., congeals at 34° and boils at 350–380° C.—W. Markownikoff and A. Reformatsky (Journ. f. prakt. Chem.), Apoth. Ztg., 1893, 638.

The Bulgarian Otto-of-Rose Industry.—A translation of the bill submitted to the Bulgarian Sobranje by the Deputy for Kizanlik for checking the abuses connected with the otto-of-rose industry in Bulgaria.—Chem. and Drug., 1894, 261, 252 (See also Brit. and Col. Drug., 1894, 311).

Otto of Roses—German.—The rose plantations established two years ago in the suburbs of Leipzig, have been so successful that they have been largely extended. The trees have withstood the severe weather of the recent winters and developed most satisfactorily. It is stated that great heat is objectionable in the culture, a cool temperature and a somewhat moist condition of the atmosphere being the chief conditions of a good yield. A factory has been built in the midst of the rose fields which will consume 50,000 Kilos. of leaves daily, and is expected to produce as a minimum about 40 Kilos. of essential oil, the estimated value of which, together with that of the rose-water and pomade produced, will be from £2000 to £2500. Only the requisite quantity of flowers for immediate use will be gathered at any one time, and the roses will be but a few minutes in passing from the trees into the macerating receptacles. It is claimed that the oil produced in Saxony last year was better than the Turkish product in delicacy, strength, and the lasting character of its perfume.—Kew Bull., 80,229; Pharm. Jour. Trans., 1893, 262.

Oil of Rose.—Bertram and Gildermeister (Jour. f. prakt. Chem., 1894, 185.

Eckart's examination of the oil has proved that its chief constituent was an alcohol, rhodinol—$C_{10}H_{18}O$. Monnet and Barbier have recently found that this rhodinol was also contained in French geranium oil. As the production of artificial oil of rose from geranium oil was thus approximated, Bertram and Gildemeister tested the various geranium oils of the market for their content of rhodinol. They were not able to isolate from these oils a body possessing the properties of Eckart's rhodinol.

The fractions which were supposed to contain rhodinol consisted substantially of geraniol. But the interesting fact was disclosed that the Turkish oil of rose, freed from stearoptene, as well as the German rose-oil, was principally geraniol. Rhodinol is impure geraniol. It was also established that the geraniols obtained from the oil of *Andropogon Schœnanthus*, from the African geranium oil yielded by the leaves of various Pelargonium species, from oil of citronella, and from Turkish and German oil of rose, are identical; the same applies to Barbier's licarhodol from linaloe oil. With the geraniol $C_{10}H_{18}O$, a substance possessing the fragrance of honey is mingled; united with geraniol it produces the peculiar rose-odor. As it is present in rose oils in very tiny quantities, its determination presents no easy task; though the authors may undertake it in the future.

With respect to stearoptene, they add that that of the Turkish as well as the German oil of rose is a mixture of hydrocarbons, from which they were able to separate two bodies possessing melting-points of 22° and 40°–41° C. respectively and the composition $C_{16}H_{34}$.

Indian Grass Oil.—W. Dymock, C. H. J. Warden and D. Hooper, in Pharmacographia Indica, iii., 557. The Andropogon schœnanthus was first brought to the notice of Europeans by General Martin, who collected the seeds in the Balaghat, during the war with Tippu Sultan, and cultivated the plant at Lucknow, whence he sent seeds to Roxburg, in Calcutta. The first mention of the oil is by Maxwell, in 1825, (Calcutta Med. Phys. Trans., i., p. 367); it was afterwards described by Forsyth, 1827, (Ibid., iii., p. 213). The A. Nardus, of Ainslie, which he calls ginger or spice grass, is doubtless the same plant; he notices its use in infusion as a stomachic, and states that an essential oil is prepared from it which is useful in rheumatism.

Preparation of the Oil.—The oil distillers in Khandesh call the grass Motiya, when the inflorescence is young and of a bluish-white color; after it has ripened and become red it is called Sonfiya. The oil obtained from it in the first condition has a more delicate odor than that obtained from the ripened grass. The motiya oil is usually mixed with the second kind, which by itself would not fetch a good price in the European market. The grass grows freely, though not very widely, on open hillsides in West Khandesh, especially in Akráni. The original seat of the manufacture was Pimpalner, but as the oil is in great demand, the manufacture has of late spread to Nandurbár, Sháháda, and Taloda. The makers are Mussulmans who, at the close of the rains, about September, when the grass is ripening, buy it from the Bhils, stack it, and set furnaces at the sides of brooks where wood and water are plentiful. A large pit, four feet long by two wide, and two and a half deep, is dug, and a furnace (chula) prepared. On this furnace is placed a copper or iron caldron, large enough to hold from thirty to fifty pots of water. After pouring in some water, the caldron is filled to the brim with chopped grass, and a little more water is added. The mouth of the caldron is carefully closed with an iron or copper plate, made fast with wheat dough. From a hole in this lid, a bamboo tube, wrapped in a piece of cloth plastered with the flour of Udid (Phaseolus Mungo, Linn., black var.), and bound with ropes, passes into a second closed caldron, sunk to the neck in running water. The steam from the grass is condensed in the second caldron, which, when full, begins to shake. The tube is then skilfully removed, and the contents of the caldron poured into a third similar vessel and stirred. Then the oil begins to appear on the surface, and is slowly skimmed off. The distillate is returned with fresh grass to the still. In 1879–80 the number of stills was 197, producing about 71 cwts. of oil. More than 100 stills are worked in Nandurbár alone, and the increase of the manufacture is prevented only by the scarcity of grass. The oil is packed in skins, and sent on bullock back over the Kundabaibára Pass to Surat, and by Dhulia and Manmad to Bombay.

Bombay dealers declare that all the oil of commerce is more or less adulterated; and a comparison of the commercial article with some oil distilled by one of the authors supports this statement; the adulteration is said to be practised by the distillers, who are said to be regularly supplied with oil of turpentine from Bombay. 373 lbs. of grass received from Khandesh and submitted to distillation under their own superintendence in Bombay yielded 1 lb. 5½ ozs. of oil. Portions of this oil were mixed with oils of turpentine, groundnut, rape, and linseed; with all three it formed a milky or turbid mixture, but the two first, after standing for some days, became perfectly bright. It is stated that formerly it was the custom to adulterate with groundnut oil, but that turpentine is now used, as it cannot be detected by the evaporation test.

The use to which Rúsa oil is put in Turkey, to which country it is principally exported, viâ Egypt and the Red Sea ports, from Bombay, was first explained by Hanbury (N. Repert. f. Pharm., viii., 365), and in "Pharmacographia" the following interesting statement is found: "No drug is more subject than ottar of rose to adulteration, which is principally effected by the addition of the volatile oil of an Indian grass, Andropogon schœnanthus, L. This oil, which is called in Turkish Idris yaghi, and also Entershah, and is more or less known to Europeans as Geranium oil, is imported into Turkey for this express purpose, and even submitted to a sort of purification before being used. It was formerly added to the attar only in Constantinople, but now the mixing takes place at the seat of the manufacture. It is said that in many places the roses are absolutely sprinkled with it before being placed in the still."

The oil of A. schœnanthus distilled by one of them was dextrogyre, the ray being rotated 39° to the right by a column of 100 Mm., and 78° by one of 200 Mm. Some samples of the commercial oil rotated the ray about 13° to the right, and others had little or no effect upon it. The color of the genuine oil was that of pale sherry; the commercial samples were more highly colored. The odor at first resembles that of the rose, but there is a persistent and terebinthinate after-flavor which is not agreeable. The taste is pungent and agreeable, approaching that of ginger.

Chemical Composition.—The oil of this grass, which has been named geraniol ($C_{10}H_{18}O$), is an alcohol belonging to the series $C_nH_{2n-2}O$. The two samples examined by F. W. Semmler (Ber. d. Chem. Ges., 23, 1098), which yielded 90 per cent. of geraniol, must have been adulterated, as they turned a ray of polarized light 20° to the left, whereas the genuine oil distilled by one of the authors was strongly dextrogyre. Geraniol, which occurs also in Pelargonium radula, Aiton, has a fragrant odor of roses, and is miscible with alcohol and ether; the boiling point at 17 Mm. pressure is 120.5°–122.5° C., and the refraction 48.71. With calcium chloride at 50° C. it forms a crystalline compound, $(C_{10}H_{18}O)CaCl_2$, decomposed by water and slowly oxidized by air. Potash-fusion forms iso-valeric acid. Neutral aqueous K_2MnO_4 forms acetic and iso-valeric acids. Even boiling baryta water slowly forms iso-valeric acid. Chromic acid mixture forms citral (Semmler), HNO_3 forms nitrobenzene, HCN, oxalic acid and a resin, but no camphoric acid (Beilstein, Chemie, iii., 265; Watts' Dict. Chem., 2nd ed., ii., p. 609; Ber. v. Schimmel and Co., April, 1891, p. 37).

Commerce.—The official statistics only show the combined export of grass oils, and do not enable anyone to distinguish the different kinds. In 1888–89, 15,270 gallons of these oils, valued at Rs. 267,800, were exported. As already stated, the production of Rúsa oil in Khandesh, the chief source of supply, does not much exceed 70 cwts. yearly. The value of oils of good quality in Bombay is about Rs. 3½ per pound. It is exported in pots containing about 40 pounds each.—Pharm. Jour. Trans., 1894, 522.

Sandal-Wood Oil.—Schimmel and Co. state that in spite of the conditions of supply the price of the oil has fallen to a level which is quite out of proportion to the difficulty and cost of preparing the article. There has been offered by a New York firm as "German sandal-wood oil" a product which possesses the following properties: Sp. gr. 0.949 (the sp. gr. of genuine sandal-wood oil being at least 0.975); opt. rot. —40°39′. It was insoluble in 70 per cent. alcohol, but dissolved in eight parts of 90 per cent. alcohol. The odor resembled cedar-wood oil rather than sandal-wood oil, and the sample generally agreed fairly well with the other physical properties of cedar-wood oil. They have ascertained in cedar-wood oils of their own distillation variations in specific gravity of between 0.946 and 0.952 and in optical rotation of from —25° to —38°. Cedar-wood oil is insoluble in 70 per cent. alcohol, but gives a clear solution with 10 volumes of 90 per cent. alcohol.

These data suffice to show the close relationship between this "German sandal-wood oil" and cedar-wood oil, but the resemblance becomes still plainer by taking pure East Indian sandal-wood oil, cedar-wood oil and the sample under examination and comparing the parts of each which pass during fixed intervals of temperature in fractional distillation.

Parts distilled over in fractional distillation in vacuo with 14 Mm. pressure:

	East Indian Sandal-wood oil.	Cedar-wood oil.	"German Sandal-wood oil."
125°—155°	nil	89.2 per cent.	80 per cent.
155°—170°	95.5 per cent.	6.7 "	14 "
Residue	4.5 "	4.1 "	6 "
	100.0	100.0	100.0

These figures show conclusively that, even if any genuine sandalwood oil was present in the suspect sample (which it would be difficult to prove), the "German sandal-wood oil" consisted in the most favorable case of 90 per cent. cedar-wood oil and 10 per cent. sandal-wood oil.

Referring to Cripp's proposed test for this oil (Proc. 1893, 891) they state that they find it may be rendered somewhat more stringent by using 70 per cent. alcohol instead of 75 per cent., at a temperature of about 20° C. instead of 15.5°, but in the same proportion, viz., 1 to 5 parts by volume. They have never met with a sample of lower specific gravity than 0.975 in normal sandal-wood oil, and consider that that figure may be taken to indicate the lowest permissible specific gravity. H. Haensel, dealing with the same test, finds that the conditions can be still more precisely and strictly defined than they are by Cripps, especially in reference to the rotation of polarized light and solubility in dilute alcohol. He has found East Indian sandal-wood oil to be clearly soluble, even when the rectified spirit only contained 90 per cent. of alcohol by volume, and four volumes of it were mixed with one volume of distilled water. In these five volumes one volume of the East Indian sandal-wood oil dissolved quite clear. With respect to polarization, he has recently again experimented with the fresh oil, and has determined that the portion of oil first passing over rotates more strongly to the left than the subsequent fraction, having a specific rotation of 50.50° in a 200 Mm. tube, whilst that of the latter is 47.90°. The rotation to the left in an East Indian sandal-wood oil is therefore very marked.—Schimmel and Co., Semi-Annual Report, Oct., 1893.

Sandal Wood Oil—Note on Sp. Gr. of.—M. Conroy concludes as the result of a series of determinations that the sp. gr. of this oil as given in the B. P., is too low in view of the fact that all of the likely adulterants are of lower density. In his opinion the minimum sp. gr. should not be less than .972 at 60° F. These results corroborate those of other writers on this subject.—Pharm. Jour. Trans., 1893, 187.

Sandal Wood Oil from Singapore.—Examination by Kremel showed this to be an adulterated article.—Pharm. Post, 1894, 99.

Solidification of Santal Oil.—Calmel is reported (Bull. Comm., 1893, No. 7) to have obtained with santal oil a clear and transparent mass that may easily be divided into pills; the following is the formula he employed:

Resin	8 parts.
Santal oil	10 parts.
Calcined magnesia	1 part.

Melt the resin at a gentle heat; then add the oil with which the calcined magnesia has previously been triturated and let it cool, shaking from time to time.

Distillation of Sandal Wood Oil in India.—Description in Amer. Drug. and Pharm. Rec., 1893, 314.

Oil of Spike.—G. Bouchardat, after making a re-examination of the oil of Lavandula spica, describes it as consisting for the greater part of linalool, which he regards as identical with the licareol of Barbier, laurel camphor, and eucalyptol. He also finds present small quantities of borneol, terpineol, geraniol, a terebenthene, and a copaivene, together with traces of other undetermined products.—Comp. rend., cxvii., 53.

Essence of Tarragon and its Transformation into Anethol.—E. Grimaux. —Estragol and anethol differ by the isomerism of their group C_3H_5.—Bull. Soc. Chim. de Paris, xi.–xii., No. 2.

Thuja Oil.—By allowing bromine to act upon thujone, Wallach (Lieb. Ann., 275, 164) has obtained a crystalline tri-bromide, melting at 121°–122° C., with effervescence and dark discoloration. Treatment of thujone with an alkaline bromine solution resulted in the formation of an acid, $C_{10}H_{16}O_4$, melting at 146°–147° C., and isomeric with camphoric acid.—See Schimmel's Report, Oct., 1893.

Oil of Turpentine.—Criticism by C. Kleber upon paper published in Proc., 1893, 156.—Pharm. Rund., 1893, 259.

Turpentine—American Oil of.—J. H. Long.—The specific gravity and specific rotation of nearly 40 samples of oil of turpentine have been determined, including commercial products and specimens prepared in the manner described by the author, so as to exclude changes brought about by exposure to air or during distillation. It appears from these results that the oil collected from spruce trees is laevorotatory, $[a]_D = -34.828$; in two cases the rotation was greater than that observed by Tilden for pure australene, namely, $+29.581$ and $+25.114$ respectively. Exposure of the gum on the trees does not appear to lower the rotatory power of the product. Pinene is accompanied in the turpentine by a laevorotatory compound of higher boiling point, and the author suggests that this may possibly be the hitherto unknown laevorotatory cymene. On exposure to light during 20 days, commercial turpentine exhibits a slight increase in rotation: but no precautions were taken to exclude moisture, or even air. By the action of air, the specific rotation, specific gravity and boiling point rise, and the turpentine becomes yellow. The compound formed by the action of sodium on commercial turpentine appears to be without effect on the rotatory power, since the latter is practically unchanged after the removal of the sodium compound. The rotatory power of the hydrochloride, $C_{10}H_{16}$,HCl, was also determined, = − 7.036, that of the original turpentine being + 15.607, although the absence or otherwise of the laevopinene derivative was not proved; the results appear to show that the relationship in molecular rotatory power between compounds and their simple derivatives is fallacious (Compare Flawitzky, Ber. d. Chem. Ges., xv. 5)—Jour. Anal. Chem., 1893, 99.

Petroleum Products in Oil of Turpentine.—S. J. Hinsdale applies the following: Put ten drops of the oil of turpentine to be examined in a moderately concave watch-glass, and float the glass on about a quart of water which has a temperature of about 170° F. If the oil is pure it will evaporate and leave the glass quite dry in seven minutes. If the oil contains even 5 per cent. of petroleum it will not have completely evaporated in that time. This experiment will prove the absence or presence of petroleum in the sample.

To estimate percentage of petroleum adulteration, weigh a watch-glass and put into it ten drops of the mixture and weigh again. Put into another glass ten drops of pure oil of turpentine and float both glasses on about a quart of water at about 170° F. As soon as the pure oil has evaporated take off the glass which contained the mixture and weigh it. The difference between this weighing and the weight of the glass will indicate four-fifths the amount of petroleum in the mixture. Knowing the weight of the ten drops the percentage can be calculated. A bent loop of wire is convenient to place on and remove the watch-glass from the water.

The hydrometer will detect adulteration with benzin of petroleum, but it cannot be used to estimate the amount of adulteration. The specific gravity of pure oil of turpentine is about 0.865 at 60° F. Petroleum is the usual adulterant.—West. Drug., 1894, 16.

Oil of Valerian—Volatile Carbides of.—Oliviero finds that oil of wild valerian contains two carbides, $C_{20}H_{16}$, both boiling at 157°–158° C., a camphene slightly lævo-rotatory and a lævo-rotatory turpentine, as well as some slightly lævo-rotatory citrene.—Compt. rend., cxvii., No. 26.

Violet Perfume.—F. Tiemann and P. Krüger have endeavored during ten years to isolate the chemical principle to which the odor of fresh flowers of the violet and of orris rhizome is due. They now state that the odorous principle of orris is a ketone, $C_{13}H_{20}O$, which they name irone. It is an oil, freely soluble in alcohol, ether, chloroform, etc., and boils at 144° C. under a pressure of 16 Mm. Its specific weight is 0.939 and index of refraction $n_D = 1.50113$. It is dextro-rotatory, forms a crystalline oxime melting at 121.5° C., and is transformed into a hydrocarbon, irene, $C_{13}H_{18}$, when acted upon by hydriodic acid. An isomeric ketone, ionone, $C_{13}H_{20}O$, having also a violet odor, can be obtained from citral. This body distils at 126°–128° C., has a specific weight of 0.9351, index of refraction $n_D = 1.507$, and may be transformed into the hydrocarbon ionene, $C_{13}H_{18}$. The isomeric hydrocarbons, irene and ionene, yield on oxidation an identical product, ioniregene-tricarboxylic acid, $C_{13}H_{12}O_7$.—Compt. rend., cxvii., 548.

Oil of Ylang-Ylang.—A. Reychler assigns to the portion which passes over on re-distillation the formula $C_{10}H_{18}O$. Hence it belongs to the alcohol of which the type is geraniol. The boiling point of ylangol at a pressure of 28 Mm. is from 103° to 108° C. Its molecular weight is 150, theory demanding 154. Its specific gravity as a liquid is 0.886 at 15° C. The index of refraction at 15.5° C., and for the yellow sodium light is 1.47165, and its molecular refractive power is = 48.64. The rotatory power is $[a] = -20.7$.—Bull. Soc. Chim. de Paris, xi.–xii., No. 9.

TERPENES AND CAMPHORS.

Terpenes and Ethereal Oils.—O. Wallach. Those terpene and terpinene compounds, which are derivatives of paracymene, may be distinguished by the position of the double bonds, numbering the carbon atoms in the direction of the hands of a watch from that which carries the methyl-group.—Ann. der Chem., 1893, 105.

Isomerism in the Terpene Series.—O. Wallach gives an explanation of the relations between limonene (or dipentene) derivatives and terpinol which accounts for the dihydrohalogen additive products of limonene being inactive, whilst some limonene hydrochlor-nitrolamines are active. An asymmetric carbon atom always occurs in the latter, and not in the former, on this interpretation.—Ber. d. Chem. Ges., 1893, 3072.

Bergaptene.—A nitro-bergaptene, $C_{12}H_7(NO_2)O_4$, has been prepared by Pommeranz (Monats. für Chem., 1893, 28). It melts with decomposition at 250° C. and, on oxidation by means of nitric acid, yields a nitro-methoxy-cumaron-carbonate, $C_{10}H_7(NO_2)O_5$, together with its aldehyde. This solid body melts, with evolution of CO_2 and N_2O, at 200° C.

Hydrocamphene—Liquid Isomeride of.—L. Bouveault. The product obtained by the action of dry hydrogen chloride on oil of turpentine was heated to boiling, and gradually mixed with sufficient sodium to remove the whole of the chlorine, and the product was repeatedly fractionated, the hydrocamphene being removed by repeated cooling and crystallization. A fraction was thus obtained boiling at 148–151° C., and yielding no crystals when cooled; its composition corresponded with a mixture of 75 parts of a hydrocarbon $C_{10}H_{18}$ and 25 parts of a hydrocarbon $C_{10}H_{16}$. Treatment of this fraction with hydrogen chloride does not remove the whole of the terpene, but this is readily effected by treatment with bromine in chloroform solution, and on fractionating the product, a colorless liquid boiling at 148–149° C. is obtained. It has the composition $C_{10}H_{18}$, and its vapor density corresponds with the molecular weight 138. This liquid, which has a faint odor of oranges, is isomeric with hydrocamphene, from which it is readily distinguished by its boiling point, and the fact that it does not crystallize. It seems also to be isomeric with the camphene hydride obtained by Berthelot by the action of hydrogen iodide on oil of turpentine. The new hydrocarbon is not attacked by bromine or by fuming sulphuric acid at the ordinary temperature. The author calls it provisionally hydropinene.—Compt. rend., 116, 1067–1070.

Camphene in Ethereal Oils.—J. Bertram and H. Walbaum have obtained camphene from the oils of citronella, ginger and camphor.—Jour. f. prakt. Chem., Jan. 4, 1894.

Campholene.—W. Guerbat. Campholene is a colorless liquid, of an odor analogous to that of turpentine, and a burning taste. It boils at 134° C. under a pressure of 758 Mm. In the liquid state its specific gravity is 0.8115. It is without rotatory power. It is insoluble in water, but soluble in alcohol, and mixes with ether, chloroform and carbon disulphide. The author has studied its behavior with bromine, gaseous hydriodic acid, a mixture of fuming nitric and sulphuric acid, and with bromine in presence of aluminum bromide.—Bull. Soc. Chim. de Paris, xi.–xii., No. 9.

Phosphorus Derivatives of Camphene.—J. E. Marsh and J. A. Gardner. —Jour. Chem. Soc., 1894, 35.

Picene.—E. Bamberger and F. Chattaway. Picene melts at 350° C. (uncorr.), 364° C. (corr.), and has therefore a higher melting point than any other known hydrocarbon. The three hydrocarbons, picene, chrysene and phenanthrene, resemble one another very closely and may be converted by similar steps into their parent hydrocarbons, ββ–dinaphthyl, β–phenylnaphtalene, and diphenyl.—Ber. d. Chem. Ges., 1893, 1751.

Terebene.—H. W. Jayne has again examined a number of samples of terebene, and finds that all really pure and inactive terebenes give no fractions under 165° and very few if any under 170° C. When we consider the difference in the gravity of commercial oil of turpentine, and note that the Pharmacopœia does not require the turpentine used in manufacturing terebene to have a certain gravity, it is to be expected that the resulting preparations should show widely different gravities.

Experience has shown that terebene is approximately 0.02 lighter than the turpentine from which it has been made. Some grades of undoubtedly pure oil of turpentine show very low gravities. Recently a shipment of oil of turpentine was received, having a gravity of only 0.855, yet was without doubt pure, tests failing to show any adulteration. A large quantity of this oil was treated as usual, with small quantities of sulphuric acid in successive portions, samples being taken after each addition. The following table gives the results of each test, and clearly shows how the gravity falls and the boiling-point rises as the product becomes more inactive. The first column shows the gravity of the mixture of terebene, colophene, etc., before distilling with steam.

	Gravity before distilling	Gravity after distilling.	Rotation for 10 Cm.	Percentage distilling to								
				160°	165°	170°	175°	180°	185°	190°	195°	200°
Original turpentine....	0.86	0.855	10°45′	38	76	84	88	90	92	94	—	—
After first acid.........	0.88	0.852	9°42′	18	64	80	85	88	90	93	—	—
After second acid	0.90	0.843	5°52′	—	10	46	70	80	86	92	—	—
After third acid	0.92	0.840	2° 7′	—	—	6	45	68	80	85	88	92
After fourth acid	0.93	0.840	0°16′	—	—	2	33	60	75	84	87	92
After fifth acid	0.94	0.835	0° 4′	—	—	8	46	68	78	82	86	89

The crude terebene so obtained was then distilled to remove the higher boiling portions.

Examinations of commercial terebenes show that many of them contain a large percentage of oil of turpentine, yet they appear to be satisfactory to the medical profession.

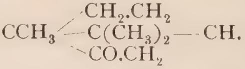
If a terebene containing a small amount of turpentine gives satisfactory results, it appears useless to prepare a perfectly inactive article, for the yield is then very small and the cost of production correspondingly high. A terebene containing only 3 per cent. of turpentine, on being treated to render it inactive, showed a loss of 50 per cent.—Amer. Jour. Pharm., 1894, 225.

Terebene.—F. B. Power and C. Kleber criticise the U. S. P. description of Terebene. After reviewing the literature of the subject and showing that the earlier writers agree in ascribing to it the formula $C_{10}H_{16}$, having a boiling point of from 135° C. (?) to 160° C., they take up the work of Armstrong and Tilden in 1879, and show that these investigators first proved the so-called terebene to be a mixture of different bodies distilled at 155° to 186° C. These bodies were regarded as camphene, terpilene (or dipentene) cymol and "a paraffin like hydrocarbon." The residue remaining in the still (crude colophene) was subjected to further treatment and camphene, cymol, terpilene and borneol again separated. The authors then take up their own investigations and state that "by the action of sulphuric acid upon oil of turpentine, with the use of the most varying proportions and temperatures, it has not been possible for them to obtain any considerable amount of a product having so low a boiling point as that generally stated for terebene, namely 156° to 160° C." The terebene prepared by them began to boil at 170° C., and was a colorless, optically inactive liquid, having a specific gravity of 0.955 at 15° C. The product was subjected to fractional distillation in a columnar apparatus, when "an exceedingly small fraction was obtained at 155° to 157° C." This was optically inactive and supposed to consist of pinene; but chemical tests did not confirm it as such. They therefore conclude that, in spite of the statement of the Pharmacopœia, "in the preparation of terebene by the action of sulphuric acid upon oil of turpentine, no inactive pinene is formed." A second fraction boiled at 159° to 162° C. This was oxidized by means of chromic acid and camphor obtained, proving it to be chiefly camphene, but the amount obtained was much smaller than that obtained by Armstrong and Tilden. The authors are "undecided as to whether in their experiments a part of the camphene originally formed was polymerized by action of the sulphuric acid, or whether oil of turpentine may not contain camphene in varying proportions." A larger third fraction was obtained between 170° and 176° C., and oxidized with permanganate of potassium, then separated from unoxidized hydrocarbons by distillation with steam. This was shown to consist of cymol and a very small portion of a "paraffin-like hydrocarbon," having the formula $C_{10}H_{20}$. A fourth and a chief fraction was secured at 178° to 182° C., and proved to be a mixture of dipentene and terpinene. By continuing the fractionation successive portions were obtained having successively higher boiling points. These were concluded to be oxidation products from failure of other tests of identity. The results of the investigations are then summarized substantially as follows:

1st. By the action of concentrated sulphuric acid upon oil of turpentine, pinene is not obtained. 2d. The boiling point of the preparation recognized as terebene is 170° to 185° C., instead of 156° to 160° C., as stated in the Pharmacopœia. 3d. Its specific gravity is about 0.855, instead of 0.862 at 15° C. 4th. Terebene consists for the most part of the hydrocarbons dipentene and terpinene with some cymol and camphene, and cannot properly be described as resembling oil of turpentine in its chemical proportions (U. S. P.).

Two commercial samples of terebene were examined. The first was shown to be merely a mixture of French and American oil of turpentine in such proportions as to be nearly optically inactive. The second had "been prepared by action of sulphuric acid upon American oil of turpentine, but without sufficiently prolonged action of the acid," whereby a larger yield is obtained and the product is dextrototory.—Pharm. Rund., 1894, 18.

Anethol—Action of Nitrous Acid on.—G. Boeris.—Gazzetta, 1893, 165: Jour. Chem. Soc. (Abs.), 1894, 72.

Camphor and Its Derivatives—Constitution of.—J. Bredt. This formula for camphor  $CCH_3\begin{array}{l}\diagup CH_2.CH_2 \\ -C(CH_3)_2 \\ \diagdown CO.CH_2\end{array}\!\!-CH.$ correctly expresses the reaction of camphor and its derivatives.—Ber. d. Chem. Ges., 1893, 1092.

Action of Zinc Chloride upon Chloro-Camphor—Relation Between Camphor and Carvacrol.—A. Etard. Carvol hydrochlorate behaves as a phenol addition product, for it is split up by simple distillation (with or without zinc chloride) into carvacrol and HCl. Chlorocamphor behaves in the same manner as a carvacrol hydrochlorate.—Compt. rend., 1893, No. 20.

Carvol and Terpineol.—An inaugural dissertation by F. Kerckhoff from the University of Göttingen.

Cinnamol.—The name given by a French physician to a rectified oil of cinnamon which he employs as an antiseptic application for wounds in the form of an ointment prepared by mixing 75 parts of retinol (or rosin oil), 25 of sterilized wax, and one each of cinnamol and beta-naphtol.—West. Drug., 1893, 326.

Coriandrol.—Oil of coriander according to Barbier yields a hydrocarbon ($C_{10}H_{16}$), an alcohol named coriandrol, and an oxygenated body not yet described. Coriandrol, when treated with acetic anhydride, gives rise to a dextro-rotatory limonene, of which the physical and chemical properties are identical with those of licarene, together with an acetic ether of a stereo-isomeric alcohol corresponding to licarhodol and apparently identical with it. Barbier considers, therefore, that coriandrol is but a dextrorotatory modification of licareol. It is a colorless liquid, boiling between 92° and 93° C., and differs from licareol in odor, but otherwise possesses similar properties. The aldehyde and an acid formed from it are both inactive and apparently identical with those derived from licareol, and all the evidence tends to prove that this alcohol exists in the two modifications, differing in the direction of their rotatory power but otherwise practically identical.—Pharm. Jour. Trans., 1893, 82; from Compt. rend., cxvi., 1459.

Eucalypteol.—Eucalpytene hydrochlorate $C_{20}H_{16}$—2HCl. Prepared by Anthoine, consisting of white scales, insoluble in water, very soluble in alcohol, ether and oils. Melts at 50° C. Recommended as antiseptic for the mucous surfaces of the organs of respiration. Administered in doses of 0.25 Gms. in emulsion. Pharm. Centralh., 1894, 95.

Pure Geraniol.—This alcohol when pure is described as a colorless liquid with an exceedingly fine rose-like odor. It is optically inactive, has a sp. gr. at 15° C. of 0.882 to 0.885, and boiling point 230° C. It is very soluble in even highly diluted alcohol, one part by volume added to 12 to 15 parts of 50 per cent. alcohol yielding a perfectly clear liquid. Being readily oxidized by the air, and its specific gravity and boiling point being thereby increased, it should be kept in full, stoppered bottles in a cool place.—Schimmel's Bericht, April, 1894.

Geraniol.—Ph. Barbier has completed his researches on the open chain alcohols, of the formula $C_{10}H_{18}O$, by studying the geraniol extracted from the oil of Andropogon schœnanthus. Referring to Semmler's investigation of the constitution of this alcohol, he points out that the resulting formula seems to indicate the existence of a stereo-isomer having the same relation to geraniol as licareol to licarhodol. Acting upon geraniol with acetic anhydride, in a closed vessel at 150° C., the only product was geraniol acetic ether, $C_{10}H_{17}O.C_2H_3O$, a colorless liquid of agreeable odor, boiling at 129°–130° C. Alcoholic potash saponified this ether, producing geraniol anew, but in a purified condition, being now perfectly colorless, and having a much finer and more fragrant odor than the primitive alcohol possessed. Treated with dry hydrochloric acid gas, the geraniol gave a liquid di-chlorhydrate, $C_{10}H_{18}O_2$, boiling at 142°–143° C., and this, decomposed by means of a boiling acetic solution of potassium acetate, formed dipentene. Geraniol is therefore regarded by Barbier as presenting itself as the stable stereo-chemical modification, its passage through the acetic combination resulting in no isomeric change, but only in the purification of the compound. With regard to Bouchardat's claim to have transformed linalool into geraniol, Barbier points out that if linalool is identical with licareol, as the former asserts, the product of the reaction described must be licarhodol (see preceding note) and not geraniol, these two alcohols being totally different both in their constitution and properties. Judging from Bouchardat's results, he is of opinion that the linalool of oil of spike is nothing but an unstable stereo-isomeric modification of geraniol, playing the same rôle with regard to that as licareol to licarhodol, and thus confirming and aiding in the generalization of the facts previously submitted. —Compt. rend., cxvii., 120.

Lemonol.—This name is applied by Barbier and Bouveault to the alcohol contained in the essential oil of Andropogon schœnanthus, which they claim to have proved to be absolutely different from the essential oil of pelargonium. The name "lemonol" is intended to indicate the relations of alcohol with citriodoric aldehyde, for which the name "lemonol" is suggested as appropriate on account of its origin from essence of lemongrass, Andropogon citratus (Graminaceæ).—Compt. rend., cxviii., 1154.

Licareol and Licarhodol—Licareol is the name given by P. Barbier to the alcohol ($C_{10}H_{18}O$) present in the oil of Licari kanali (Licaria guianensis). This oil has been described by Morin (Ann. de Chim. et de Phys., v., xxv., 427). Licareol is lævorotatory and yields licareal or licaric aldehyde ($C_{10}H_{16}O$) and licaric acid ($C_{10}H_{16}O_2$) by oxidation. By the action of bromine, *licareol* forms a tetrabromide; when acted upon by dry gaseous HCl, it is converted into a dichlorhydrate; whilst acetic anhydride causes its dehydration, an acetic ether being formed, and an optically active limonene ($C_{10}H_{16}$), termed licarene. On saponification of the acetic ether, a new alcohol, *licarhodol* ($C_{10}H_{18}O$), is formed. This has a strong odor of roses, and is regarded as a stable stereo-isomer of licareol.—Pharm. Jour. Trans., 1893, 82.

Action of Acetic Anhydride on Linalol.—G. Bouchardat. Linalol obtained from Lavandula spica seems to be identical with licareol. When treated with acetic anhydride at the ordinary temperature, it yields an acetate which regenerates linalol on saponification, but if heated at 100–120° C. a different acetate is formed, which, when saponified, yields a new alcohol, analogous to or identical with licarhodol. When saponified with alcoholic potash at 100° C. it yields a neutral compound $C_{10}H_{18}O$, which, under normal pressure, boils at 226–231° C. with slight decomposition; sp. gr. at 0° C. = 0.9061; it has an odor of roses, is optically inactive, combines readily with bromine, and yields an inactive dihydrochloride of sp. gr. 1.046. This alcohol, and therefore licarhodol, also, seems to be identical with the geraniol obtained from Indian essential oil of geranium. —Compt. Rend., cxvi., 1253–1255.

Menthol.—An inaugural dissertion by A. Berkenheim, from the University of Göttingen.

The Menthol Market.—Statistics showing the principal fluctuations in menthol since 1883.—Chem. and Drug., 1894, 624.

Menthol.—When extracted from Japanese oil this body is slightly different from that extracted from the American oil. Japanese menthol forms small prismatic crystals, while American menthol consists of long, fine needles, and the difference is due to the method of preparation. American menthol appears to have slightly higher gravity than Japanese—at all events in the melted condition. The melting-points vary only by about ⅓° C. The American variety boils at 212.5° C., while the Japanese varies from 210–213° C. The rotatory powers are practically identical, and it is probable that the trifling difference in physical properties is by no means due to any difference of chemical constitution, but to some impurity, probably menthone.—Jour. Pharm. Chem., 1893.

Rhodinol.—This isomer of geraniol, according to Barbier, stands in a similar relation to licareol, but it yields valerianic acid by oxidation. The evidence regarding its constitution points, as in the case of licareol, to the existence of two stereo-isomers, one stable and the other the reverse, the unstable compound being transformable into the first after heating with acetic anhydride. Rhodinol submitted to this treatment formed only rhodinol-acetic ether, a colorless mobile liquid of agreeable odor, boiling at 131° C. On saponification, unaltered rhodinol was re-formed from this ether. The alcohol appears, therefore, to constitute the stable modification, corresponding to an, as yet, unknown unstable one capable of conversion into the former on treatment with acetic anhydride.—Compt. rend., cxvii., 177.

Rhodinol and Camphene in Essential Oils.—Monnet and Barbier have separated rhodinol, which constitutes the odorous principle of otto of roses, from the essential oil of pelargonium. The figures and reactions obtained on analysis of the compound seem to indicate its complete identity, both physically and chemically, with that from the better known source. Bouchardat affirms the existence of a dextrogyre camphene in the oil obtained from Lavandula spica, and Oliviero finds a similar compound in that from wild valerian.—Compt. rend., cxvii., 1092–4–6.

Terpineol.—O. Wallach and F. Kerkhoff. Bouchardat and Voiry obtained terpineol in a solid crystalline form; the authors find that it melts at 35° C. and remains in superfusion for long periods.—Ann. der Chem., 1893, 103; Jour. Chem. Soc. (Abs.), 1893, 595.

Tonquinol.—A new compound offered as a substitute for musk, and is said to be a derivative of a nitrited terpene and a nitrited sulpho-acid of xylol. Tonquinol is in the form of a white crystalline powder, which, after solution in fifty parts of alcohol, may be mixed with water in all proportions. It is claimed to be very permanent and cheaper than Baur's artificial musk.—West. Drug., 1893, 286.

OILS (FIXED).

Oils—Analysis of.—W. Fahrion some time ago attributed the gradual fall in the iodine number of oils to polymerization setting in, and has since confirmed his views. When such polymerized oils are saponified, the acids seem temporarily to revert to their original condition, and the author therefore estimates the iodine number as follows: 0.15–0.25 Gm. of the oil is completely saponified with alcoholic soda, phenolphthaleïn is added, and the liquid exactly neutralized with $\frac{N}{2}$ hydrochloric acid. The iodine absorption is then estimated by means of Hübl's solution, chloroform, being, however, omitted. It appears that even apparently fresh oils are already to a certain extent polymerized, as the iodine absorptions by the author's method give results greatly in excess of the ordinary method. A sample of cotton-seed oil, for instance, gave 104.8 per cent. by the old method, and 150 per cent. by the modified process.—Chem. Zeit., 1893, 434.

The Iodine Absorption of Fat and Fixed Oils.—The test proposed by von Hübl, which has proven such an important factor in the study of this class of bodies, despite the objectionable feature, first announced by its originator, of the continued deterioration of the standard solution, has received attention from a number of sources, having for their object the correction of this defect. In the Am. Jour. Pharm., 1893, 382, P. Welmans proposes a mixed solvent of ether and acetic acid. W. Fahrion (Chemiker Ztg., 1893, 1100), substituted methyl alcohol for ethyl alcohol in making the solution and examined the solution repeatedly during four weeks; the decrease in strength, after one month's standing was, for the ethyl alcohol solution, 33.6 per cent., while for the methyl alcohol solution it amounted to only 12.1 per cent.; the latter lost during the first twenty-four hours 1.1 per cent., the former 6.6 per cent. F. Gantter calls attention to the mercuric chloride and proves that apart from solvent and excess of iodine, which had previously been announced as matters of importance in getting trustworthy results the presence of the mercuric chloride in varying amounts will give as results variable iodine absorption figures, the greater the amount of mercuric chloride the higher the iodine absorption; probably the most important result obtained was that in the presence of mercuric chloride, the saturated fatty acids, like lauric and stearic, absorbed iodine. For these experiments a solution of iodine in carbon tetrachloride was used, the mercuric chloride was dissolved in the smallest possible quantity of absolute alcohol, and diluted with carbon tetrachloride, to make a solution of 5 Gm. in 100 C.c.; this introduced very little alcohol when added to the iodine solution. Gantter recommends therefore to omit the mercuric chloride in the iodine absorption tests, and as a simply alcoholic solution acts too slowly, he suggests an iodine solution in carbon tetrachloride; this solution is most rapidly made by stirring or agitating one gram iodine with small portions of the solvent at a time, decanting and adding another portion, etc., until all of the iodine is dissolved, and the solution measures one litre. The sodium thiosulphate solution is made by dissolving 19.528 Gm. in sufficient water to make one liter solution. These solutions are titrated as in the original method by Hübl. To determine with them the iodine absorption of oils, etc., about 100 milligrams of a drying oil and 200 milligrams of a non-drying oil are weighed into a glass-stoppered bottle, 50 C.c. of the iodine solution added, agitated until the oil is dissolved, the iodine solution covered with a layer of water to prevent loss of iodine, and allowed to stand fifty hours; the excess of iodine is then titrated by adding the thiosulphate solution until after agitation only a faint red color remains; the addition of a small quantity of starch paste is then made and the thiosulphate added until the mixture is completely decolorized. The difference in the sodium thiosulphate solution required in the blank and actual tests gives the quantity from which the iodine absorbed by the oil is calculated. The results obtained are notably lower than those obtained by Hübl's method, although they are proportionately about the same: Cotton-seed oil, 43–45; linseed oil, 76, and lard, 23–27.—Dr. F. Gantter (Ztschr. f. Anal. Chem.), Südd. Apotheker Ztg., 1893, 133, 145 and 265; Amer. Jour. Pharm., 1893, 456.

Determination of Iodine Absorption of Oils and Fats.—P. Welmans proposes a solution which is permanent or subject only to slight variation in titer. The solution is made by dissolving without heat 25 Gm. iodine and 30 Gm. mercuric chloride in 500 C.c. ether and making up to one litre with acetic acid. The solution titrated at once, and after two weeks showed that no deterioration had taken place; compared with the original Hübl's solution in the examination of olive oil and lard, it was found to give almost identical results, also that the presence of ether did not necessitate the use of chloroform. Concerning the time required for the complete absorption of the iodine, eighteen hours' standing at 17–20° C. was found to be sufficient, while six hours was insufficient; the influence of an excess of iodine was completely exerted in the presence of an excess of 28 per cent.—Pharm. Ztg., 1893, 221.

Determination of the Iodine Number.—E. Dieterich (Helfenberger Annalen., 1892, 3) now considers the excess of 75 per cent. of iodine required by Dieterich (Chem. Zeit., xvi., 1176, 1472) as unnecessary.

——— R. Seeliger suggests the following method for the purpose of dispensing with the use of mercuric chloride. Chlorine is passed into a solution of 10 Gm. iodine in 200 C.c. alcohol for about ten minutes, when the iodine is converted almost suddenly into trichloride. Excess of chlorine is then driven off on the water-bath and the cooled solution made up to 250 C.c. On adding to this solution potassium iodide (1 to 5) a quantity of iodine equivalent to the chlorine is liberated, and it can be determined with a decinormal solution of thiosulphate. In carrying out an experiment with oleic acid, for example, 0.3 Gm. dissolved in alcohol mixed with some chloroform is added to 10 C.c. of the iodine trichloride solution diluted with 50 C.c. of alcohol, and the whole left to stand for twenty-four hours. Then the potassium iodide solution (10 C.c.) is added, and after one hour the iodine liberated is determined with decinormal solution of thiosulphate, after having made a similar determination without adding oleic acid. The difference between the two results gives the iodine number. If fat is separated on adding the potassium iodide solution, some chloroform is to be added, or an alcoholic solution of potassium iodide may be used. As hydrochloric acid and other chlorinated products may be formed by passing chlorine into alcohol, Seeliger recommends dissolving the iodine in carbon tetrachloride, and afterwards making up to 250 C.c. with alcohol or ether.—Pharm. Centralh., xxxv., No. 7).

The Elaïdin Reaction.—A. Lidoff. Oils which do not dry become solid when treated with nitrous acid, on account of the conversion of the oleïn they contain into elaïdin. Drying oils, on the other hand, remain liquid under similar treatment, although at the same time their chemical and physical properties are considerably modified. Their sp. gr. increases as well as their viscosity and saponification ratio. The iodine coefficient and Hehner's ratio diminish. All oils after treatment with nitrous acid contain nitrogen, varying in amount from 1 to 2.5 per cent. These substances may be reduced by various agents, yielding new substances which probably contain the amido-group. The free unsaturated acids yield no such compounds. Jour. Russ. Chem. Soc., 1893, 515.

The Stilling of Waves by Oil.—This is best effected by those oils which are richest in free oleic acid, says Richter (Pharm. Centralh., 1894, 204), who has made extensive investigations as to this phenomenon. He finds that the addition of 1 per cent. of free oleic acid imparts this power to petroleum oil, while olive oil deprived of its free acid is not any more effective than petroleum oil itself. He further observed that one drop of oleic acid when dropped on the surface of water spread out instantly and with such force as to drive to the edge of the receptacle light particles, such as seed floating on the surface of the water. In fact he observed that the force exerted by this spreading of a single drop of oleic acid was sufficient to move a board weighing five pounds. This is a wonderful power to be exerted by an amount of oil weighing from four to six one-hundredths of a Gm., and when spread out on the water from two to four millionths of a millimeter thick.

Purification of Fats and Oils.—Toellner purifies oils and fats of all descriptions, for medicinal and technical use, in the following manner: To each part of the material to be purified he adds from one-fourth to one-third of its weight of a decoction of one part of soap bark in ten parts of water. The mixture is agitated until emulsified. It is then passed once, or oftener if necessary, through granulated animal charcoal. The saponin of the quillaja bark, along with all impurities of the fatty matter, is retained by the coal. The oil mixed with the water pours off, and on being left to stand soon separates and the purified material can be drawn off. It is claimed that the amount of carbon necessary is very small, and that by heating after using it can be used over and over again.—Nat. Drug., 1893, 170.

——— Ochre, hæmatite, or limonite may be employed, according to Scollay (Chem. Ztg., 1893, No. 83). Any one of these is shaken with the oil, filtered, and set aside. A small quantity of borax, sodium, or calcium chloride, may be used in addition to the ochre. The latter can be obtained directly in the oil, from iron chloride, calcium or aluminum chloride, and an alkali. The sodium chloride is then removed by washing.

Oil Producing Plants of Formosa.—Particulars extracted from a special report on the resources and trade of Formosa by A. Hosie on the following: Dolichos soja, L. (?), Brassica chinensis, L., Sesamum indicum et orientale, D. C., Arachis hypogœa, L., Stillingia sebifera, S. and N., Camellia thea, Link., Cinnamonmum camphora, N. and E. and Ricinus sp.—Pharm Jour. Trans., 1894, 584; from Board of Trade Jour.

Patent Bread Oil.—An oil employed by bakers. It possesses an orange-red color with a green fluorescene and a neutral taste. Upon heating in a platinum dish it does not give off an acrolein odor. Sp. gr., 0.905; saponification number, 4 2; acid number, 0.32; iodine number, 13.9. A nearly pure mineral oil.—Pharm. Centralh., 1893, 405.

Asaba Oil.—A yellow oil, (Annals di Chim. e. Farmacol), of 0.922 sp. gr. congealing at —3° C., which is obtained from the seed of one of the cucurbitaceæ. It is a drying oil.

Oleum Cacao.—Dieterich obtained M. P. 28.5° to 33.5° C.; sp. gr., at 15° C., 0.968 to 0.977; acid figure, 10.08 to 24.64; iodine number, 29.56 to 36.83. In M. P. Dieterich found, by careful heating, 28.5 to 29.0° C., heating 5 minutes longer upon water-bath it rose 29.5 to 30° C., after heating 5 minutes over naked flame 29.0 to 29.5° C.—Helfenberger Annalen; Pharm. Post, 1894, 426.

Castor Oil in India—Production of.—Three processes are described by the U. S. Consul at Calcutta, by which the castor oil is extracted in the Madras Presidency.—Pharm. Jour. Trans., 1894, 562; from Jour. Soc. Arts.

Oleum Ricini.—Dieterich obtained iodine number, 82.38 to 84.67; acetyl acid figure 143.92 to 144.74; acetyl number, 160.37 to 161.33; acetyl saponification number, 304.29 to 305.91. He considers the acetyl number as very important, but too detailed for practice.—Helfenberger Annalen; Pharm. Post, 1894, 427.

Quantitative Determination of Castor Oil.—G. Morpurgo (Pharm. Post, 1893, 245) has devised the following: When a fixed oil containing more than 10 per cent. of castor oil is well mixed with three times its own volume of paraffin oil and allowed to stand at a temperature of from 10° to 15° C. two layers are formed, the upper and larger layer consisting of the fixed oil and paraffin oil, and the lower, thinner layer consisting of the castor oil. If dark mineral oil is used instead of the purified oil, the impurities of the mineral oil will be given up to the castor oil and the latter will become quite dark, leaving the mineral oil pure and clear. If it is desired to examine an oil according to this method, it is decidedly advisable to previously test the mineral oil to be used. By noting the results of each test, comparing the quantity of castor oil used with the thickness of the layer which separates out, this method can be used for quantitative estimation.

According to F. Di Vetere the following method serves well for quantitative determinations. If a mixture of seed oil and castor oil be mixed with half its volume of hydrochloric acid, the mixture after a time separates into three layers, the lower being the hydrochloric acid, the middle the castor oil, and which varies in color with the character of the oil present, and, finally, the upper layer, consisting of the seed or olive oil.

These methods, however, only give accurate results when the oil under examination contains as much as 40 to 50 per cent. of castor oil. Its solubility in 90 per cent. alcohol serves as an identity test of the castor oil, as does also the following proposed by Draper (Zeitschr. f. Analyt. Chem., 116): Add 5 or 6 drops of nitric acid to a few drops of the oil; when the reaction has ceased, neutralize with sodium carbonate. As soon as the odor of nitric acid has passed off, the odor of œnanthylic ether manifests itself.

Cotton-Seed Stearin and Maize Oil.—May be easily determined by the determination of iodine absorption, rise of temperature and Bechi's and Wellmann's test.—F. Hart, in Chem. Zeit., 1893, 1522.

Colza Oil.—E. J. Parry and P. A. Estcourt give analyses of 35 samples. —See Chem. and Drug., 1894, 140.

Hazel-Nut Oil.—This oil has recently been examined and appears to be almost, if not quite, as useful for medicinal purposes as almond oil. It possesses a mild taste and smell and is of a bright yellow color. It is not a drying oil. Its sp. gr. is 0.9164. With the elaidin test it gives a firm yellowish mass. It contains a small quantity of free fatty acids, one gram neutralizing 0.0035 Gm. of potash. Its saponification equivalent is 191.4, and its iodine absorption 83.2. They do not give the color reactions of the acids of almond oil.—H. Solstien, in Pharm. Zeit., 1893.

Oil from the Seeds of Hyoscyamus.—Thorough chemical examination of the oil.—Arch. der Pharm., 1894, 130.

Kapok-Oil.—Certain plants of the Malvaceæ resemble those classed under the title Gossypium (the true cotton plants) in possessing a filamentous covering on their seeds. Inferiority in mechanical properties, *e. g.*, length and strength of fiber, prevents the use of this material for the same purposes as cotton. The best known of these plants is the Kapok (Eriodendron anfractosum, Dec., Bombax penandrum, L.), which grows in the Dutch East Indies; its cotton is used for stuffing beds and mattresses in place of horsehair. The seed itself is similar to cotton-seed, in that oil can be expressed from it, such oil being used as a food, and for soap-making in Holland. As will be seen from the analytical constants obtained on the examination of the oil, it is of the same class as cotton-seed oil. The sample examined by the author possessed the following characteristics: The oil was of greenish yellow color, and slight inoffensive smell and taste. It was viscous and turbid, becoming clear, however, on standing from the separation of stearin, analogous to cotton-seed stearin. When treated with sulphur chloride or sulphuric acid, Kapok oil evolves considerably more heat than cottonseed oil.—R. Henriques, Chem. Zeit., 1893, xvii., 1283.

Adulterated Linseed Oil.—The writer says that the pernicious system of adulterating oil, carried on by the jobber and in some cases by the small western crusher, was unfortunately never so prevalent as at the present time. It is however possible to procure a fine article. The writer then proceeds to discuss the tests for purity and adulterations.—Drugs, Oils and Paints, 1893; West. Drug., 1894, 12.

Poisonous Linseed Oil.—A sample of linseed oil which caused symptoms of poisoning was found to have been obtained from seed containing about 35 per cent. impurities; the chief one present, to the extent of 15 per cent., was the seed of Lolium temulentum or more exactly L. remotum.—Pieszczek, Apoth. Ztg., 1893, 335.

Artificial Aging of Linseed Oil.—Villon, having made a study of the subject, finds that perfect "aging" depends not merely upon getting rid of the mucilaginous matter, but upon dehydration, and that fact suggested a process recently made public by which the end, formerly requiring months and even years to accomplish, is now attained in a few minutes. This process consists in warming the oil together with a definite quantity of anhydrous zinc sulphate. The salt is insoluble in the oil, but possesses the property of coagulating the mucilaginous matter, and at the same time withdraws all water from the oil. The oil, after being treated, is ready at once for use in the finest paints and varnishes, and resembles the best products of the most careful aging.—Nat. Drug., 1894, 115.

Oxidation of Fatty Oils.—Investigations with linseed oil.—W. Fahrion, in Chem. Zeit., 1893, 1848.

Mineral Oils—The Flash-Point and Point of Danger in.—D. R. Stewart writes that the old government open test and the American fire test are altogether deceptive, and that in stove, barrel or tin can, the flash-point Abel test is a point of real danger, and that for oil in large masses the danger begins even below the flash-point (Abel). The experiments also prove that, except for very small surfaces of oil, the flash-point and the fire-point are the same.—Chem. News, 1893, 291.

Sperm Oil and Mineral Oil—Analysis of Mixtures of.—C. A. Lobry de Bruyn uses the process recommended by Allen and Thomson, but has made a slight modification. 5 Gm. of the sample is boiled for some hours with a solution of 2 Gm. of sodium hydroxide in 25 C.c. of absolute alcohol. The liquid is diluted with water and shaken twice with light petroleum, which is then washed with water, and finally distilled off in a weighed flask. The contents are, after weighing, boiled with twice the volume of acetic anhydride. Complete solution takes place, but, on cooling, the mineral oil separates almost entirely, and can be readily removed from the acid. The author finds, however, that it retains a small proportion of acetic acid, which causes it to solidify in contact with metallic sodium; it is therefore necessary to agitate it with a weak alkali, and again dissolve it in light petroleum. After distilling off the latter, the mineral oil is left in a pure state.—Chem. Zeit., 1893, 1453.

Determination of Fatty Oils in Mineral Oil.—According to J. Klimont (Chem. Zeit., 1893, 543), fifteen Gm. of the oil which is to be examined for the presence of small quantities of fatty oil should be saponified in a flask, holding about 400 C.c., with 100 C.c. of an alcoholic solution of caustic potash (not soda), by boiling under a vertical condenser for one or two hours. The contents of the flask are then diluted with an equal bulk of water and filtered through a wet filter. The residue of mineral oil is well washed, the filtrate exactly neutralized with hydrochloric acid, allowed to stand in a separating funnel until thoroughly cold to get rid of any remaining mineral oil, and then extracted with petroleum ether to complete the removal of the unsaponified portion. The aqueous liquid containing all the fatty oil as soap is concentrated to 100 C.c., precipitated with a solution of calcium chloride, and the resulting lime soap collected on a weighed filter, washed with the least possible quantity of cold water, dried and weighed. It is then ignited, and the residual lime weighed again, giving the fatty acids. These can be calculated to glycerides by adding the weight of the glyceryl radicle displaced by the lime, the necesssary value being obtained by multiplying the weight of the CaO found by 0.774. The process is adapted for the determination of small percentages of fatty oils, *e. g.*, under 5 per cent., but is not suitable for larger amounts, as the lime soap incloses a good deal of potassium chloride and calcium chloride and cannot be satisfactorily washed.

Vasogen, or Oxygenated Mineral Oil.—Though formerly considered as neutral and non-oxidizable, later research has shown that the mineral oils contain acids and may be oxidized. Vasogen forms a permanent emulsion with water, and is a solvent for many medicaments.—Pharm. Zeit., 1893, 510 and 655.

Oleum Myristicæ.—Dieterich obtained M. P. 38.5 to 43.0° C., acid figure, 17.25 to 22.80; ester number, 153.53 to 161.0; saponification figure, 172.20 to 178.67, and iodine number, 40.14 to 52.04.—Helfenberger Annalen; Pharm. Post, 1894, 426.

Olive Oil in Southern Sicily.—Report of Consul C. B. Hurst, of Catania. —Nat. Drug., 1893, 34. (Also Pharm. Jour. Trans., 1893, 246.)

Olive Oil.—Dieterich has never met an adulteration with sesame oil, and appends results obtained with G. Ambühls, (Südd. Apoth. Zeit., 1882, 307), test with various oils.—Helfenberger Annalen; Pharm. Post., 1894, 426.

Sesame Oil in Olive Oil—Detection of.—Shake vigorously a mixture of equal parts of olive oil and a 1 : 14 solution of pyrogallic acid in hydrochloric acid (1.124) and set aside until it has separated into two layers. Draw off the upper (oily) layer with a pipette and boil the remainder (acid) for five minutes. If the sample contain any sesame oil, the acid solution turns purple on boiling. Pure olive oil only gives a yellow color. It is claimed that the addition of even one per cent. of sesame oil can easily be detected by this method.—Jour. de Pharm. et de Chim., 1893, 134.

——— Musset (Pharm. Centralh., 1893, No. 49) adds 0.1 Gm. of dried phosphorus to 10 Gm. of the suspected oil and places it in a water-bath until dissolved. The resulting mixture is placed at a temperature sufficient to keep it liquid. A peculiar striped appearance is given to the surface of the liquid. If the sample is pure olive oil a white cloudiness only appears at the end of 24 hours. In a mixture containing but 10 per cent. of sesame oil the stripes are darker, and upon the sides and bottom a clear yellow appearance is observed. On adding ammonia the pure oil is not colored, but a mixture containing sesame oil is colored a deep brown.

To Detect Castor Oil in Olive Oil.—S. Leonardi (Pharm. Ztg., 1893, 705) recommends the following very simple method: 10 C.c. of the suspected oil are vigorously shaken with 5–10 C.c. of alcohol (94–100 per cent.), and then set aside until the two layers have become completely separated. If the olive oil is pure, its volume will increase and that of the alcohol decrease; but if it contains castor oil, the contrary will occur—that is, the volume of the oil will decrease and that of the alcohol increase. For a quantitative estimation, alcohol is employed which has previously been saturated with olive oil, and filtered; the increase in volume of the alcohol will then correspond exactly to the quantity of castor oil contained in the olive oil. The presence of castor oil is further confirmed by mixing the suspected oil with concentrated alcoholic potassa-solution and heating it, when the peculiar odor of caprylic alcohol will appear.

Detection of Cotton-Seed Oil in Lard and Olive Oil.—F. Gautter has found the following modification of the sulphuric acid test to give reliable qualitative results: 1 Gm. of the anhydrous fat or oil is dissolved in 10 C.c. petroleum-ether and agitated with one drop concentrated sulphuric acid. Pure lard will only give a pale straw or reddish yellow color, separating later some heavy reddish yellow globules while the supernatant liquid is colorless or faintly yellow; in the presence of cotton-seed oil an immediate brown coloration is noticeable which enables the detection of one per cent. of the oil. Pure olive oil generally behaves like the pure lard, but may become slightly dark; in the presence of cotton-seed oil, the color is a deep or even black-brown. Arachis oil is the only other oil showing similar behavior towards sulphuric acid. For quantitative results calculation is made from the iodine absorption.—Ztschr. f. anal. Chem., (Chem. Rep.,) 1893, 166.

German Substitutes for Olive Oil—Beechnut and Linden Oil.—A. C. Johnson.—Bull. Pharm., 1893, 564.

Rape Oil—According to Reimer and Will it consists of the glycerides of three distinct fatty acids, one of which melting at 70° C. occurs only in very small quantities. The other two, erucic acid and a liquid acid which the authors name rapinic acid, are present in equal quantities. Lead erucate is readily soluble in hot ether. The zinc salts of the fatty acids can be separated by means of ether.—Jour. f. frakt. Chem., 1893, 487.

Sesame Oil.—The color test for this oil with sugar and hydrochloric acid, which has been considered a characteristic test, has during the past few years also been obtained with some brands of olive oil originating in Southern Italy and Northern Africa as well as with some samples of arachis oil. Villavecchia and Fabris, in a study of sesame oil, find the principle giving the color to be a dense, uncrystallizable, non-nitrogenous oil, which, in alcoholic solution, will give red color with sugar and hydrochloric acid. In this test there is produced furfurol, and this has repeatedly been proven to be the substance which is actively concerned in the production of color reactions, as the sugar in all such tests can be replaced by furfurol solutions; the tests obtained by the use of the latter are generally more delicate. A specific test for sesame oil, originating with Villavecchia and Fabris, is based upon the use of an alcoholic furfurol solution (2 Gm. in 100 C.c.); of this furfurol solution 0.1 C.c. is placed in a test tube, 10 C.c. of the oil under examination and 10 C.c. hydrochloric acid, sp. gr. 1.19 added, agitated for half a minute and allowed to stand; in the presence of one per cent. sesame oil in the suspected oil, the aqueous solution separates with a red color, while in the absence of sesame oil only a yellowish color is produced. A modification of this test consists in adding to 0.1 C.c. furfurol solution, 10 C.c. of the oil, 1 C.c. hydrochloric acid, agitating, adding 10 C.c. chloroform to dissolve the oil, and noting the color of the aqueous layer; less than one per cent sesame oil is sufficient to give a fine red color; in the absence of sesame oil no color is to be seen, or in the cases of those olive oils giving the color with the original test a greenish color is produced.—G. Morpurgo, Pharm. Post., 1893, 537.

Test for Sesame Oil.—If five volumes of the oil be agitated with one volume of Bettendorf's reagent and heated in a water-bath for a few minutes, a deep wine-red color is imparted to the reagent. Olive oil containing a very small quantity of sesame oil will give rise to a red coloration; pure olive oil only causing an orange yellow coloration.—P. Soltsien, Pharm. Ztg., 1893, 654.

Sunflower Oil.—According to Dr. A. Jolles and E. Wild, it has an iodine-absorption figure of 127, and with Becchi's test gives a more pronounced brown coloration than cotton-seed oil; the test found to answer best in distinguishing it from cotton-seed oil is nitric acid of specific gravity 1.37, the latter oil becoming brown while sun-flower oil is not discolored.—Chem. Ztg., 1893, 879.

Oleo de Tamacoaré.—An examination of this Brazilian product of vegetable origin (Caraipa fasciculata and C. myrciæfolia), called "Oleo or Balsamum de Tamacoare."—Arch. de Pharm., 1893, 522.

CARBON COMPOUNDS.

GENERAL.

Critical Pressures in the Homologous Series of Organic Chemistry.—E. Mathias (Compt. rend., cxvii., No. 26). By causing a substance to enter into several different homologous series, we calculate a priori its critical pressure.

Aluminum Chloride—Synthesis with.—P. Genvresse.—When 500 Gm. of normal propyl bromide is added gradually to a boiling mixture of 700 Gm. of benzene free from thiophene and 40 Gm. of aluminum chloride, and the product is washed with water, dried over calcium chloride, and fractionated, a mixture of normal propylbenzene and isopropylbenzene is obtained. It would seem that the proportion of the latter would be reduced by the use of as small a proportion of aluminum chloride as possible.—Compt. rend., 116, 1065–1067.

Purifying Toluol, Benzol, etc.—R. J. Friswell treats crude toluol for four hours with 10 per cent. by volume of sulphuric acid of sp. gr. 1.803.—Chem. News, 1893, 27.

Nomenclature of Organic Chemistry.—E. Seelig does not, as it might have been hoped, propose any remedy for the ultra-sesquipedalian nomenclature of organic chemistry.—Jour. f. prakt. Chem., xlix., No. 8 and 9.

Nomenclature of the Ureic Compounds.—L. Maguenne gives a catalogue of these compounds with their old and new names and with their formulæ.—Bull. Soc. Chim., 1893, No. 23; Chem. News, 1894, 13.

Nomenclature and Formulæ of Carbon Compounds.—See Pharm. Jour. Trans., 1894, 874, etc. An article on the derivatives.

Chemistry of Modern Organic Materia Medica.—A paper on the Polybasic Acids, Aromatic Acids, Sulphuric Acids, Bases (Urethanes, Anilids, Hydrazines, Azenes).—Notes on New Rem., 1893, 20.

Acetone—Volumetric Estimation of.—F. Robineau and G. Rollin. The process consists in converting the acetone into iodoform, by dissolving it in aqueous soda containing potassium iodide, and adding a standard solution of hypochlorite until a drop of the solution gives a blue spot on starch paper. To standardize the hypochlorite solution, 2 Gm. of pure acetone is made up to 500 C.c. 100 C.c. of this solution is mixed with 10 Gm. of potassium iodide, and 20 C.c. of aqueous soda (sp. gr. 1.24). The hypochlorite is then run in until only a faint turbidity is produced, when the starch test should be applied. Methyl or ethyl alcohol does not interfere with the process, and paraldehyde only when present in large quantity.—Chem. Centralb., 1893, 961.

A Natural Non-Saturated Acetone.—Ph. Barbier and L. Bourcault. The composition of this acetone is $C_8H_{14}O$. It has a penetrating but pleasant odor, and boils at 169°–170° C. at the ordinary pressure. Its molecular weight is 126.—Compt. Rend., cxviii., No. 18.

Isovalerianic Aldehyde with Ordinary Acetone—Condensation of.—Barbier and Bourcault have obtained a substance (isoamylidene acetone) which is distinctly different from the methylheptonone of Wallach.—Compt. rend., cxviii., No. 4.

Acetophenone Derivatives.—The halogen and amido-compounds of aceto-phenone are put forward as new remedies, but their use is not yet stated, so far as we can ascertain. Pyrogallol is heated with chlor- or bromo-acetic acid or their salts or esters, and the following reaction takes place.

$$C_6H_3(OH)_3+ClCH_2COOH=CH_2Cl.CO.C_6H_2(OH)_3+H_2O.$$

This oxyderivative of chloro-acetophenone reacts easily with bases giving amido-compounds. Such bases as aniline, pyridine, quinoline and methylamine are used, and the resulting compounds are the subject of the patent.—Brit. and Col. Drug., 1893.

Alcohol—Absolute.—E. R. Squibb has performed fresh work on the dehydration of alcohol and reviewed his former labors with different methods and some improvements in apparatus. Premising that sp. gr. was the sole indication of strength to be relied on, special care was devoted to effecting improvements in apparatus so as to ensure it being accurate and highly sensitive. To this end the author devised an improvement of the sp. gr. bottle he designed some years ago upon the plan of a thermometer. The author expected to obtain more perfect de-hydration by often repeated percolation through lime. The results showed that no part of the distillate was anhydrous. The author concludes that up to the present time no really anhydrous alcohol has been obtained.—Jour. Amer. Chem. Soc., xv., 126. (See also Ephemeris, Jan., 1894.)

Absolute Alcohol—Tests for.—P. W. Squire finds by experimenting with the *anhydrous sulphate of copper* test that 8 grains of that salt, shaken in a small stoppered bottle with 2 drams of the alcohol, should not show a blue coloration within seven minutes. He says regarding the *permanganate of potassium* test that it is unsafe, however, to trust to a "crystal" of permanganate, as these are occasionally covered with a thin film of oxide, invisible to the eye, but sufficient to prevent the coloration of alcohol containing 2 or 3 per cent. of water. The crystal should be powdered, or at least well crushed, before placing it in the alcohol.

Regarding the bisulphide test, he claims that a much more exact method of utilizing the reaction is to add to 1 C.c. of the alcohol under examination 5 C.c. of carbon bisulphide, and note the temperature at which, if clear, it becomes turbid on cooling, and, if turbid, at which it becomes clear on warming. In working this test, the following figures may be taken as a guide:

95 per cent alcohol	88° F.
97 " "	60° F.
98 " "	43° F.
98½ " "	33° F.
99 " "	21° F.

For accuracy, delicacy, and easy application this test is unsurpassed. The only objection is the disagreeable smell of commercial bisulphide of carbon, even when "re-distilled." This, however, is removed largely by prolonged digestion over shreds of bright copper foil.

As one of the most common uses of absolute alcohol is as a de-hydrating agent in microscopical work, previous to "clearing" in some essential oil or hydrocarbon, it may be noted that nothing below 96 per cent. will clear into xylol or benzol, or below 95 per cent. for unoxidized cedar oil. The strongest spirit at present commercially obtainable by direct rectification is just short of this—viz., 69° over proof, equal to 94 per cent. alcohol, sp. gr. .811-.812.—West. Drug., 1893, 9; from Chem. and Drug., 1893.

Purifying Alcohol with Sodium Dioxide.—A. M. Villon considers that the use of sodium dioxide alone accomplishes the object of purifying alcohol as that of the oxidizers and soda. It suffices to obtain a superior return of good alcohol and a thorough separation of foreign substances, to add 100 to 150 Gm.—according to the nature of the alcohol to be purified—of this salt to a hectolitre of alcohol 24 hours previous to rectification, which then progresses regularly, it is stated.—Bull. de la Soc. Chim. de Paris, 1893.

Ethylic Alcohol—Action of Chlorine on.—M. Altschul and V. Meyer have examined an oily liquid which is obtained as a by-product in the manufacture of chloral by the action of chlorine on ethylic alcohol. The oil was separated from admixed chalk and calcium chloride by distillation with steam, and, on rectification, three fractions were obtained: the first portion (60–90°) consists largely of chloroform, which appears to be formed by the action of the steam on trichloracetic acid. The second fraction (90–140°) has not yet been investigated; the third (140–168°) consists of ethylic dichloracetate, trichlorethylic alcohol, and probably dichlorethylic alcohol. Ethylic dichloracetate was identified by the production of ethylic iodide and dichloracetamide; the trichlorethylic alcohol yields a metanitrobenzoate, $NO_2C_6H_4.COO.C_2H_2Cl_3$, crystallizing in transparent plates; it melts at 75° C. and is identical with the compound prepared from pure trichlorethylic alcohol.—Ber. d. Chem. Ges., 1893, 2756.

Alcohol from Peat.—Instead of the compact wood cellulose, the peat-fibre is now being used for preparing alcohol, this fibre being finer and more accessible to chemical action. The peat coming directly from the moor is boiled 4 to 5 hours at 115° to 120° C. with diluted sulphuric acid, whereby the cellulose of the peat is converted into sugar. When boiling is over and the maximum of sugar formation has been reached, the saccharine broth is separated from the sediment by filter-presses and fermented with yeast, and the alcohol thus formed is distilled off. 1000 kilogms. of dry peat yielded thus 62 to 63 litres of alcohol; while 500 kilogms. of potatoes (containing 20 per cent. starch) yielded, even with careful management, not more than 60 to 61 litres of alcohol.—Rundschau, 1893, No. 28.

Rectified Spirit.—A paper by C. E. Sage, with illustration of Coffey's still.—Chem. and Drug., 1894, 572.

Early Methods for Obtaining High Alcohol.—O. Guthrie describes an economical process.—Apothecary, 1893, 78.

Experiments in Freezing Alcohol.—The success attending Dewar's experiments in the freezing of absolute alcohol has a peculiar interest, in view of the fact that 200° C. was the utmost limit of cold reached or obtained by man, viz., by the use of liquid oxygen. Dewar allowed some liquid ethylene to flow through a brass tube surrounded by solid carbonic acid and ether, and, when this cooled, it was passed into a large test tube, in the middle of which was placed a glass tube with a flattened bulb at the end, the bulb being full of absolute alcohol. The evaporation of the ethylene was then accelerated by the use of the air pump, and the alcohol was frozen into a mass as clear and transparent as crystal. The tube containing it was turned bottom upward, and as it melted it assumed exactly the consistence of glycerin, flowing in a sluggish way down the sides of the tube. Ether requires less cold than alcohol to freeze it, and in several of

Dewar's experiments ether ice formed on the sides of the glass vessels. Besides this, the warm air of the theatre was constantly condensing as snow or hoar-frost on some of the vessels used in the experiments, and the chief difficulty of the occasion was the projecting of the experiments on the screen by the electric light so that all present might see what was taking place.—Amer. Drug. and Pharm. Rec., 1893, 221.

Estimation of Oil of Turpentine in Alcohol.—Alcohol containing turpentine will stand more or less dilution with water before a turbidity is produced. The more turpentine is present, the less will be the amount of water required. On this fact the author bases his process for a quantitative estimation of turpentine in denatured spirits. 5 C.c. of the sample is put into a test glass and water is added from a burette until a permanent turbidity is produced. 5 C.c. of a 0.5 per cent. solution of turpentine in spirit of the same alcoholic strength as the sample is put into another test-glass, and also titrated. The mixture which consumes most water is the poorest in turpentine, and the author found that 1.1 C.c. of difference in water is equivalent to 0.25 per cent of turpentine. The author has also found that the turpentine cannot be removed by fractional distillation over lime.—J. Perl, in Chem. Zeit., 1894, 1851.

Spirit Assaying by Weight.—J. Sarisbrick has constructed tables which are suitable for use with a gravity bottle or any other instrument capable of ascertaining specific gravities from 1.000 to 0.790. They have been built from the invaluable material of Gilpin and Blagden, but for spirits of great alcoholic strength, the numbers obtained by Tralles, Fownes, Drinkwater, and Squibb, have been utilized. For the standard alcohol, Sikes' proof spirit at 15.5° has been adopted. The general principle proceeded on in building up the system, is the recognition of weights and not volumes, as weight does not change with temperature, but volume does, particularly in the case of alcohol.

The system proposed by the author answers for the purpose of identifying the spirit, is easily understood and quickly applied, furnishes accurate numbers for assessment at all temperatures, and satisfies the wants of all concerned.—Chem. and Druggist, 1893, 687.

Table of Sp. Gr. of Alcohol.—Table arranged for making various strengths of alcohol.—G. Rosenthal, in Zeitschr. Oest. Apoth.-Ver., 1893, 444.

The Homœotrope.—An instrument devised by E. Gossart for estimating the amount of impurity in commercial spirit. It consists of a pipette of about 4 C.c. capacity, to the top of which is attached a blind-teat, or other suitable enclosed and flexible air-container and hexagonal dish. The orifice of the pipette should not exceed 1 Mm. in diameter, The spirit to be tested is placed in this pipette, and the dish is filled with a liquid, such, for example, as a 10 per cent. aqueous solution of citric acid, which shows appreciable viscosity.

The principle of the process depends upon the fact that when the drops of spirit come out of the pipette they leave a certain degree of surface-tension, which varies with the purity of the liquid, so that when the drops fall upon the surface of the liquid in the dish, which is agitated so as to give it a concave surface, they have a peculiar "roll." By the duration and nature of the roll, the purity of the spirit is determined. In practice sulphuric acid, glycerin, or a fixed oil is used for filling the hexagonal dish, as they present a better degree of viscosity.

If we compare the behavior of pure alcohol, and alcohol mixed with acetone, the remarkable accuracy of the principle upon which the test is founded becomes apparent. It is observed as the percentage of acetone is increased that the roll of the drops becomes feebler and feebler, while a sort of dip, which is characteristic of pure alcohol, also diminishes; in fact, when 30 per cent. of acetone is reached, roll and dip altogether disappear, similarly with wood-spirit, amylic alcohol, and other impurities. The test is independent of temperature, and it is stated that as little as a thousandth or even a ten-thousandth part of impurity in alcohol can be detected.—Chem. and Drug., Jan. 27, 1894.

Denatured Spirits.—A regulation was recently passed by the French Excise, ordering that in future alcohol should be denatured when methylated, by the addition of 500 C.c. of benzene and 1 Gm. of malachite green per hectolitre. The color so produced is not deep, but yet sufficiently so to interfere with its useful employment in several processes (celluloid treatment, certain varnishes, etc.). The following simple method of decolorizing it has, therefore, been devised. A few drops of concentrated solution of hypochlorite of lime is added gradually to the alcohol until just decolorized. By careful manipulation no excess of the hypochlorite is used, and as the coloring matter is completely destroyed by the available chlorine, it can never be restored, and simple neutral salts of calcium are left, and these in such small amount as to be negligible.—Rép. de Pharm., 1894.

Copper in Alcohol or Brandy.—Detected according to E. Deltour (Bull. de Soc. de Pharm. de Brux., 1894, 16) as follows: Evaporate about 55 C.c. of the fluid in a porcelain capsule to a residue of 3 or 4 C.c. To this add a little insoluble oleic acid. In the presence of copper a beautiful green color is developed at once.

Deodorizing Recovered Alcohol.—Edward A. Kadel gives the following process for purifying alcohol which has been recovered in the making of fluid extracts, etc. The alcohol is first treated with caustic soda; when it has been recovered from drugs like arnica, buchu, cubebs, etc., 1 ounce to each gallon is employed. After standing from two to five days, it is distilled by a water bath or steam jacket kettle. The alcohol first passing over must be returned to the still. This is continued until the odor is either changed or lost. Usually this distillation leaves an empyreumatic and sometimes a soapy odor in the alcohol. It is then re-distilled with potassium permanganate; the quantity to be used can be determined by experience alone, alcohol recovered from the same drug by different processes requiring different proportions; usually 1 to 4 drams to a gallon is employed. Thus treated, it is generally clean enough for re-employment for manufacturing purposes, seldom producing any coloration with hydrogen sulphide. If further purifying is desired, again distil with the permanganate and filter through animal charcoal, but unless the charcoal is freshly prepared this is useless. When fresh charcoal is not at hand the author adds a small quantity of distilled water, and distils again after second treatment with permanganate. A 5 gallon still is employed, a fair average of 3 gallons an hour being its working capacity. Time, gas and material is fully compensated for, and in laboratories equipped with steam, the cost of purifying is reduced to a minimum.—Drug. Circ., 1893, 105.

Alcohol in Germany.—Statistics in Chem. and Drug., 1894, 853.

Detection of Monovalent Alcohols.—Bitto (Chim. Zeit., (Rep.), 1893, 296), gives the following: 0.5 Gm. of methyl violet is dissolved in a liter of water, and 1 to 2 C.c. of this solution, together with 0.5 to 1 C.c. of a solution of an alkaline polysulphide, is added to the liquid to be tested. If a monovalent alcohol be present, the liquid remains clear, but becomes cherry or violet red. It must be noted that a fair amount of the liquid to be tested should be taken, and that the coloration alters on standing. In the absence of a monovalent alcohol, the liquid becomes greenish-blue, and after a time deposits reddish-violet flocks, the liquid itself, at the same time, becoming yellow. The reaction appears to take place with substances containing the group C(OH). The behavior of the following bodies has been tried:

Substance.	Coloration.
Methyl alcohol	Cherry red.
Ethyl alcohol	Cherry red.
Normal propyl alcohol	Cherry red.
Iso-propyl alcohol	Cherry red.
Tertiary butyl alcohol	Violet red.
Iso-butyl alcohol	Violet red.
Iso-butyl carbinol	Violet red.
Allyl alcohol	Violet red.

Divalent and trivalent alcohols, carbohydrates, acids, aromatic compounds, phenols, etc., do not give the reaction.

Active Amyl Alcohol and Active Valeric Acid from Fusel Oil.—W. A. C. Rogers has separated an alcohol from fusel oil that has a slightly higher rotatory power than that obtained by Pasteur and a lower rotatory power than that of Le Bel, unless, of course, the values given by these chemists are the specific rotatory powers of the alcohols obtained by them. By oxidation of amyl alcohol acetic acid is produced—confirming statements of Pedler and Levy.—Jour. Chem. Soc., 1893, 1130.

Normal Amyl Alcohol.—L. Tissier.—Wischnegradski's inference that this alcohol is contained in fermentation of amyl alcohol, because the amylene derived from the latter contains symmetrical methylethylethylene, is erroneous, for the author was unable to isolate any of the normal alcohol from 1,600 litres of fusel oil. The methylethylethylene was doubtless formed from active amyl alcohol by molecular transformation, and as an experiment showed, it can actually be obtained in considerable quantity by allowing this alcohol to flow over fused zinc chloride contained in an iron tube.—Bull. Soc. Chim., ix., 100–101; Jour. Chem. Soc. (Abs.), 1893.

Melissic Alcohol.—A. Gascard (Jour. Pharm. Chim., 1894, 49) has definitely established the identity of the alcohols yielded by beeswax, carnauba wax, and gum lac, by repeatedly purifying them until products of identical melting-point were obtained. In the cases of gum lac and carnauba wax he found the melting-point of the alcohols to be 88° C., but that from beeswax melted at 85° C., that number according with the one previously published by Brodie. After repeated crystallizations, however, this was gradually raised to 87° C. Etherification of the alcohol was next effected, the ether purified and then saponified. The resulting alcohol, after being twice re-crystallized from benzene, was found to have a melting-point of 88° C., thus according with the figure obtained in the other cases.

Valerianic Aldehyde—Preparation of.—L. Bourcault and L. Rousset have modified the method published in the works of Würtz and Beilstein, so as to obtain 60 per cent of the alcohol employed as pure aldehyde.—Bull. Soc. Chim. de Paris, xi.–xii., No. 7.

Amides of the Alkali Metals.—The bodies were first discovered and described by Gay Lussac and Thénard, and by Sir H. Davy, but the exact conditions of their production, their number and composition, have not been fully studied. The subject is further elucidated in a paper by A. W. Titherly (Jour. Chem. Soc., ccclxxix., 504); he obtained the following results: By the action of dry ammonia gas on metallic sodium contained in glass or iron retorts heated to about 300° C., the following reaction occurred:

$$2Na + 2NH_3 = 2NaNH_2 + H_2.$$

The resulting sodamide was white and waxy in appearance; its composition was ascertained by noting the gain in weight under this treatment of a known weight of sodium, also by measuring the hydrogen evolved. During the preparation of this body a part sublimed and was obtained in white transparent crystals. According to the statements of the text-books there exist also disodimide (Na_2HN), and sodium nitride (Na_3N), but their non-existence has been proved by the present worker. On strongly heating sodamide it was found not to split up, as alleged, into sodium nitride and ammonia, but simply into its elements. It was ascertained, too, that when ammonia gas is passed over sodamide heated to a full redness, the ammonia is continuously decomposed into its elements, nitrogen and hydrogen; the amide is split up into nitrogen, hydrogen and sodium, the sodium in presence of ammonia again forms sodamide, which is decomposed as before. In this way a very small quantity of amide will decompose an unlimited supply of ammonia. Neither disodimide nor sodium nitride could be obtained by the action of metallic sodium on $NaNH_2$. By the action of ammonia on sodium oxide, only a mixture of hydrate and amide resulted, thus:

$$Na_2O + NH_3 = NaNH_2 + NaOH.$$

Potassamide.—This was prepared in the same manner as sodamide, and closely resembled the latter in general appearance and properties. Sir H. Davy considered that he had proved the formation of potassium nitride (K_3N) from this body by the action of heat; the nitride he stated to be a black infusible solid, and it is described as such in most text-books. Titherly found that any action such as that described by Davy was probably due to the action of the silica or alumina in the glass or porcelain vessels employed. And he failed altogether to obtain a nitride or dipotassimide. By using a silver boat, he found that at a temperature of between 400° or 500° C., potassimide distilled with partial decomposition into its elements. When heated in a current of hydrogen it can be distilled unchanged.

Potassium nitride could not be produced by heating potassamide with potassium oxide, nor by the direct action of nitrogen on the metal.

Lithamide.—No experiments with ammonia and lithium had previously been recorded. Ammonia gas led over heated lithium forms lithamide, differing from the preceding amides in being of a more crystalline appearance, and in being only slowly decomposed by water and acids without energetic action. Its formula was shown to be $LiNH_2$. It was analyzed by dissolving a known weight in water and estimating the amount of ammonia and lithium in the solution. When heated at 300°–400° C. with silica, sodamide and potassamide form chiefly silicate of the alkali metal and silicon nitride, the latter being obtained as a brown, amorphous powder. With boric anhydride analogous results were obtained, the equation being

$$2NaNH_2 - B_2O_3 = 2BN + 2NaOH + H_2O.$$

The boron nitride occurred as an insoluble white powder when the fused mass was treated with water. With nitrosyl chloride the principal reaction is:

$$KNH_2+NOCl=KCl+N_2+H_2O,$$

the gas being passed over the amide gently warmed in a tube.

Color Reaction of Amines and Aldehydes Without Addition of Acids.—E. Nickel. Salts of aromatic amines, particularly those of aniline, give color reactions with aldehydes. The author found, however, that the alcoholic solutions of the free bases also give colorations with some of the aldehydes. Experiments were made with the following amines: Aniline, ortho- and para- toluidine, α- and β- naphthylamine, and piperidine; also with the following aldehydes: Anisaldehyde, salicylaldehyde, parahydroxybenzaldehyde, piperonal, and vanillin. Excepting piperidine, all these amines give, in presence of acids, plain yellow colorations with the aldehydes. Without the presence of acids, the author could not get a color by means of α- naphthylamine except with salicylaldehyde. The reaction of amines with hydroxyaldehydes or their derivatives is also different in the absence of acids.

Aldehydes which contain a hydroxyl group, ortho- and para-hydroxybenzaldehyde, for instance, give, however, a yellow coloration without the addition of acid, although not so strongly and quickly as with acid. But aldehydes, such as anisaldehyde and piperonal, which contain alkyloxy-groups, do not give the reaction without addition of an acid.

Piperin, which does not belong to the aromatic series and does not contain the group NH_2, but the imide group NH, behaves differently from the other amines. In the free state, it gives yellow colorations with salicylaldehyde or vanillin, which are destroyed by the addition of an acid. But with lignin, which is related to the aldehydes, it gives a reaction, even in the presence of sulphuric acid.—Chem. Zeit., 1893, 1413.

Methylamine and Ethylamine.—Trillat and Fayollat describe a new method of preparing these compounds, which depends upon the reduction of ammoniacal compounds of formaldehyde and acetaldehyde. On mixing aqueous solutions of formaldehyde and ammonia, a compound is formed which is now said to have the composition $N_2(CH_2)_3$. This compound may be obtained in hexagonal needles, but in the present process the solution containing it is treated with zinc dust and hydrochloric acid, and subsequently with caustic alkali. Methylamine is thus liberated, and with excess of ammonia is carried by a current of steam into dilute hydrochloric acid. The acid solution is then evaporated and methylamine mixed with ammonium chloride is left. Absolute alcohol is used to extract the former, and on subsequently treating it with caustic alkali pure methylamine is obtained. In a similar way ethylamine may be prepared from acetaldehyde and ammonia.—Pharm. Jour. Trans., 1894, 621; from Bull. de la Soc. Chim. de Paris, xi., 22.

Carboxylic Derivatives of Dimethylaniline.—C. Lanth (Bull. Soc., Chim. de Paris, ix–x., No. 24). The introduction of the carboxylic group into dimethylaniline in the ortho-position gives the colored derivatives chemical and tinctorial properties very different from those of the coloring matters derived from dimethylaniline itself.—Chem. News, 1894, 24.

Danger from Chlorate of Aniline.—As a warning to his colleagues, M. A. Schlumberger (Rev. de Chim. Analyt., 1893) relates the following: Having occasion to prepare some chlorate of aniline, he was so much impressed by the beauty of the crystals which were deposited from a rather strong solution of the salt, that he undertook to produce about 30 Gm. of them, for his collection. This he accomplished, and had finished drying the crystals without accident, when, just as he was placing them in a bottle, a sudden and violent explosion took place, which shattered the glasses on his table. One of his waistcoat buttons was broken into three pieces, and a few splinters of glass lodged in his face and hands, but he fortunately escaped serious injury, although temporarily deafened by the detonation.

The Purity of Aromatic Compounds.—M. Sauvaitre proposes to examine organic compounds belonging to the aromatic series, such as benzoates, cinnamates, salicylates, salol, etc., in the following manner: 20 Cgm. of the compound are agitated with 10 C.c. of normal hydrochloric acid and 10 C.c. of ether. The liberated aromatic acid dissolves completely in the ether, and the excess of mineral acid remains in the aqueous solution. The ethereal layer is reduced, however, to 9.1 C.c., the remainder being taken up by the watery solution, which has been kept at about 15° C. 5 C.c. of the supernatant ethereal layer are drawn off and titrated after drying and dissolving the residue in alcohol. If x be the weight found, the total quantity, of course, will be $\frac{x \times 9.1}{5}$. Exceedingly reliable results are obtained by this simple method.—Rép. de Pharm., 1894.

New Contributions to the Question of the Constitution of Benzol.—J. W. Brühl gives at great length a general view of the physical and chemical results hitherto obtained, gives new observations, describes the physical constants of hexamethylene, and the volumetric, spectrometric, and thermochemical researches.—Jour. f. Prakt. Chem., 1894.

Benzylidine Dipiperidine.—G. W. Ascott has prepared the platinum double salt, the gold double salt, a compound with picric acid. and amorphous and crystalline sulphur compound and benzylidine aniline.—Amer. Jour. Pharm., 1893, 428.

Isomeric Benzoyldoximes.—Dunstan and Luxmore (Chem. and Drug., 1893, 914). Benzoyldoxime was discovered by Beckmann, and has the formula $C_6H_5CH.NOH$. There are two isomeric forms of it—the *alpha* (a liquid yellow oil according to Beckmann), and the *beta*, a white crystalline body. Dunstan and Luxmore now find that alpha-benzoyldoxime can be obtained crystalline by separating from the oil certain impurities and freezing the residue. It sets (on the addition of a crystal) into a mass of white crystals, which can be re-crystallized from petroleum ether. Thus obtained it melts at 34° C., while pure beta-benzoyldoxime melts at 125° C. The isomerism of the substance is explained on the stereochemical principle, and support is given to it by the behavior of the substances—the *alpha* readily changing into the *beta* by heat, and *vice versa*, and on treating the *alpha* with hydrochloric acid gas, hydrochloride of the *beta* compound is formed. In respect to the last fact, it is notable that alpha-benzoyldoxime hydrochloride had not so far been obtained; but Dunstan and Luxmore by operating on an ethereal solution of the base have succeeded in getting the hydrochloride as a granular non-crystalline substance. They have also obtained alpha-benzoyldoxime sulphate for the first time, and have prepared and studied the properties of the hydrobromide, hydroiodide and hydrofluoride. It is remarkable that while the hydrobromide and hydroiodide agree with the hydrochloride in conforming to the constitution $C_6H_5CH.NOH.HCl$—*i. e.*, one molecule of HBr or HI—the hydrofluoride has H_2F_2 in the molecule. The authors have also determined that the acetyl derivative is crystalline, and that the beta-isomer is the more stable. They hope in the course of the research to prove whether the stereochemical theory explains the isomerism or not.

Synthetic Borneols.—G. Bouchardat and J. Lafont propose for each of these isomers a name recalling its origin. Thus we have the borneols of camphene, and of terebenthene, borneol having a reversible power.—Compt. rend., cxviii., No. 5.

Isoborneol.—By heating camphor with a mixture of acetic acid and a small quantity of mineral acid, J. Bertram and H. Walbaum have obtained an ester having the formula $CH_3COOC_{10}H_{17}$, and by heating it with alcoholic potash they obtained a solid alcohol, $C_{10}H_{18}O$. It closely resembles borneol, but is not identical with it. From solution in petroleum spirit it crystallizes in thin feathery laminæ, is readily soluble in alcohol, ether, chloroform, or benzene, and insoluble in water. It melts at 212° C., and sublimes readily. It combines with chloral or bromal, forming well defined addition products similar to those obtained by Haller and Minguin with borneol. By treatment with de-hydrating agents, such as zinc chloride, isoborneol is readily convertible, with separation of water, into camphene. Boiled with nitric acid, or by the action of chromic acid, isoborneol is converted into a ketone, $C_{10}H_{16}O$, which cannot be distinguished from ordinary laurel camphor. By reduction with sodium this camphor yields a mixture of borneol and isoborneol, just as laurel camphor does, and both these forms of borneol yield by oxidation the same camphor. The borneol of commerce was ascertained to be a mixture of borneol and isoborneol. The above described conversion of camphor into an acetic ester and then into isoborneol is turned to account for the detection of camphor in essential oils. In this way the authors have found camphor in citronella oil, ginger oil, kesso oil from Japanese valerian root, and oil of camphor. When pinene is present in large amount, some difficulty arises in the application of this method from the hydration of this terpene to terpineol, which has about the same boiling point as isoborneol, and is capable of holding in solution a large proportion of isoborneol.—Journ. prakt. Chem., 49, 15.

Pharmacy of Bromoform.—Wm. Lyon concludes that where alcohol is admissible the glycerin and alcohol mixture with Tinct. Card. Co. suggested by Bedford is undoubtedly the best, otherwise either a solution in oil or an emulsion with mucilage of acacia or Irish moss will prove desirable.—Amer. Drug. and Pharm. Rec., 1894, 357; from Pharm. Jour. Trans., 1893, 476.

A Delicate Reaction for Para-phenetol-carbamide.—Para-phenetol-carbamide, also known as dulcin and sucrol, when in substance may be identified by the following delicate reaction: A few crystals of dulcin, contained in a small porcelain dish, are treated with a few drops of fuming nitric acid, whereby a violent reaction will ensue with the formation of a beautiful orange-yellow body. By evaporation on a water-bath there remains an orange-yellow residue, soluble in alcohol, ether, and chloroform, forming solutions having the same color. By treating the residue with two drops of liquid carbolic and two drops of concentrated sulphuric acids and mixing with a glass rod it will change to intensely blood red. The color will remain unchanged for some time if exposed to the air. In chloroform it dissolves with a beautiful red color, but this coloration disappears quite rapidly.—Pharm. Zeit., 1893, 354.

Ethyl-allyl-carbinol.—H. Fournier has previously described the preparation of secondary aromatic alcohols by the action of allyl iodide and zinc upon aldehydes, and has recently found that allyl bromide may be more advantageously used for the purpose than the iodide. The author has obtained ethyl-allyl-carbinol, by the action of allyl bromide and zinc on propylaldehyde with the addition of ether, as a colorless fluid.—Bull. Soc. Chim., 1894, p. 124.

Trehalum—A New Carbohydrate.—Trehala or trehala manna is a cocoon of a beetle found in a species of oak in Syria and Persia and which is used in those countries in food and medicine. Guibert examined this cocoon (Compt. Rend., 46, 143), as did Apping later (Dissert. Dorpat, 1885). Berthelot examined the sugar found and gave it the name trehalose. C. Scheibler and H. Mittelmeier (Ber. d. D. Chem. Gesell., 10, 93) have obtained from the cocoons a new carbohydrate to which they give the name "trehalum." To obtain trehalum boil trehala with water, either before or after the trehalose has been extracted by strong hot alcohol. Filter the decoction through a hot funnel, allow the filtrate to cool, and after 24 hours filter off the supernatant liquor from the crystals; wash these with water at the ordinary temperature, and re-crystallize from hot water. On drying in the air or over a water-bath the trehalum appears as a pure white mass, which on slight pressure breaks down into a fine white powder. The yield is about 16 per cent. Trehalum thus obtained is in tasteless, odorless, microscopic prismatic crystals, partly isolated, partly in groups, only slightly soluble in water at the ordinary temperature. It is insoluble in and unaffected by phenylhydrazine, but after heating with a dilute acid reduces alkaline copper solutions. It gives the same inversion product as trehalose (d-glucose) and an intermediate dextrin-like substance termed "trehaline."

Carbohydrates of Coffee.—E. Schulze. Chemical investigation.—Chem. Zeit., 1893, 1263.

Mannite by the Optical Method—Determination of.—J. A. Müller has ascertained that the mannite of wine is identical with the mannite of manna. In the wines examined there are not, in addition to mannite, appreciable quantities of other sugars sparingly soluble in alcohol and water in the cold, and not precipitable by basic lead acetate.—Bull. Soc. Chim. de Paris, xi.–xii., No. 7.

Starch.—C. Scheibler and H. Mittelmeier reply to the recent communication of Lintner and Düll on the same subject, pointing out that the results there detailed have, in some cases, already been described by the authors. They further do not agree with the theory proposed by Lintner and Düll, and devote the chief portion of the paper to an extension of their own theory as to the constitution of starch and the dextrins.—Ber. d. Chem. Ges., 1893, 293.

——— C. J. Lintner. In reply to the criticism of Scheibler and Mittelmeier, the author explains the grounds which led him to an independent examination and discussion of the amyloïn theory proposed by Brown and Morris.—Ber. d. Chem. Ges., 1893, 293.

Desiccation of Starch—Bloch (Compt. Rend., cxviii., 146), asserts that the desiccation of starch is incomplete at temperatures under 160° C., and meets the objection that dextrin may be formed at 100° to 110° C., by stating that this is not so, except in the presence of acids or other compounds that assist in the transformation. The pure and natural starch is said to remain unaltered at that temperature, except that a certain amount of the water originally present in the grains is of course dissipated.

Starch and Dextrin—Bleaching of.—Dry or in solution, these are bleached and deodorized by simultaneous treating with chlorine and ozone, either as gases or in solutions. These two bleaching agents perfect each other in the bleaching of the coloring matters in the above substances. The bleached dextrin is odorless and tasteless, and is used as a substitute for gum arabic.—Chem. Ztg., 1893, 1289.

Iodine and Starch.—G. Rouvier finds that the weight of starch and other conditions of the experiment being constant, if the proportion of iodine added be increased, the amount fixed also increases at first, until if a sufficient quantity be employed, a compound is obtained, containing practically 19.6 per cent. of iodine, and corresponding to the formula $(C_6H_{10}O_5)_{16}I_5$.—Compt. Rend., cxvii., 461.

Starch—Diastatic Action on.—D. B. Dott, in a paper on the determination of the diastatic action on starch, refers to the employment of this reaction for analytical purposes, describes the usual methods adopted, and mentions the resulting products. He indicates objections to the iodine method of determination, and points out that, since the reaction of maltose with Fehling's solution is well defined, the determination of the quantity formed of this sugar would seem the best test of the extent of diastatic action. A large number of experiments that had been tried under varying conditions are described in detail, and the general conclusions formed are that the diastatic value cannot be accurately determined by the amount of maltose formed, unless the starch solution is always prepared in the same way; that there would be great difficulty in fixing a standard method for the preparation of starch solution such as would ensure a constant result with the same proportion of diastase; that the method of testing for unaltered starch and erythro-dextrin with iodine is the best at present known for determining the diastatic action; and that by the action of malt extract on starch solution (2 per cent.) at 40 C.c., with one part of extract to five parts of arrowroot, the mixture should cease to give a distinct coloration with iodine after thirty minutes. The author's conclusions as to the value of the iodine method are apparently opposite to those expressed by Mr. Grierson.—Pharm. Jour. Trans., 1893, 213.

Bleaching Starch by Electricity.—The price of starch, whether from rice or potatoes, would perhaps be considerably lowered if a method recently introduced into France, of bleaching it by electricity, were generally adopted. This process, it is said, imparts to second class and even poorer qualities of starch a purity and whiteness which render them superior to the best brands now in use. It is only another example of the rapidity with which electricity is finding valuable application in almost every branch of industry.—Drug. Circ., 1893, 203.

Synthesis of Sugar.—Pellegrini (Sucrerie Indigene et Coloniale, Feb., 1894).—Into an iron box divided into two compartments by a partition of pumice stone, boiled in a solution of chloride of platinum to increase its porosity, he introduces on one side a current of carbonic acid, and on the other a current of ethylene, while aqueous vapor is made to circulate in the apparatus intermittingly. The three gases traverse the pumice stone by osmosis and combine therein, and the product of the combination under osmotic action, is a white syrup that it suffices to concentrate in order to obtain, as Pellegrini claims, pure sugar.—Reg. Pharm., 1894, 124.

Artificial Fruit Sugar.—F. H. Mason (Amer. Drug. and Pharm. Rec., 1893, 346). The process consists, apparently, in the inversion of beet sugar at a certain stage of its manufacture, by chemical treatment, into what is technically designated "Lävulose" ($C_6H_{12}O_6$), which is chemically identical with the natural fruit sugar developed in greater or less degree in most kinds of fruit—1.57 per cent. in peaches, 6.26 per cent. in plums, 10.79 per cent. in sweet cherries and as high as 15 per cent. in some varieties of grapes.

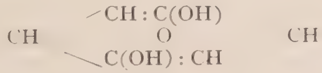
Dulcitol in Cane Sugar.—In some cane sugar obtained from India, and recently examined by E. O. von Lippmann, a considerable quantity of dulcitol was discovered. From the molasses he succeeded in isolating first mannitol and subsequently sorbitol. These substances are not usually found in cane sugar, although they are themselves sugars. Dulcitol (Dulcite, Dulcin, Dulcose, or Melampyrite) is obtained generally from a crystalline substance of unknown origin imported from Madagascar or from the plant *Melampyrum nemorosum.*—West. Drug., 1893, 139.

Cryoscopy, etc., of Caramel.—A. Sabanéeff and I. Antushevitch.—Dialyzed caramel, prepared by repeated precipitation from its aqueous solution by alcohol, is not a carbohydrate, carbonic anhydride being given off on its formation from sugars. From determinations of its molecular weight (nearly 3,000) in aqueous solution, and combustions of the substance itself, as well as analysis of the barium derivative, the author proposes the approximate formula $C_{125}H_{188}O_{80}$. The formation from sugar would then be represented by the equation:

$$11C_{12}H_{22}O_{11} = C_{125}H_{188}O_{80} + 7CO_2 + 27H_2O.$$

The aqueous solution of dialyzed caramel is affected by heat and by the action of light, the depression of the freezing point increasing, probably in consequence of a process of hydration, and formation of substances with lower molecular weight. Caramel in aqueous solution is capable of undergoing a species of fermentation, in virtue of which the depression is diminished. This is a process of de-hydration with formation of products of much greater molecular weight. Gélis' caramel is dialyzed caramel, whose solutions have undergone change by heating, whilst Graham's mucilaginous caramel, which diffuses more slowly than albumen, is the product of the specific fermentation mentioned above.—Jour. Russ. Chem. Soc., 1893, 23.

Maltol.—J. Brand. Caramel coloring malt, which has been recently introduced into the brewing and malt industry, is prepared by roasting malt, which contains a large proportion of water; it differs, therefore, from ordinary coloring malt, in possessing a considerably higher percentage of sugar. Beer, prepared from caramel malt, gives a violet coloration with ferric chloride; this is not due to salicylic acid, but to the presence of a compound termed maltol, which is distinguished from salicylic acid by giving no reaction with Millon's reagent. The temperature employed in the manufacture of malt coffee is higher than that used in the preparation of caramel malt, and in this case maltol is formed in larger quantity, and can be isolated from the volatile products in the manner described in the original paper. Maltol readily sublimes, and is deposited in colorless, odorless crystals melting at 159° C. It has the characteristic properties of a phenol, does not form an oxime or a phenylhydrazone, reduces silver solutions at ordinary temperatures, and alkaline copper solution on heating. Maltol is probably a condensation product of grape sugar, and has the formula:



$$\mathrm{CH}\begin{array}{l}\diagup\mathrm{CH:C(OH)}\\ \qquad\quad\mathrm{O}\\ \diagdown\mathrm{C(OH):CH}\end{array}\mathrm{CH}$$

This formula most readily accounts for its properties, and agrees with the analytical results and molecular weight determination.—Ber. d. Chem. Ges., 1894, 806.

Crystallization of Cellulose.—E. Gilson finds that when sections of cellular tissue are kept in contact for a time with Schweitzer's reagent (cuprammonia), then washed successively with ammonia and water, so that the copper compound is dissolved gradually and the cellulose slowly precipitated, the latter forms nodular or arborescent crystals in the interior of the cells. The crystals are insoluble in dilute acids and alkalies, but dissolve in concentrated sulphuric acid, and behave generally as cellulose. Starch must be completely removed before applying the reagent, and certain other precautions are also found to be necessary. Two distinct substances appear to be present in most cellulose membranes, one only of which is crystalline; the other is amorphous, and gives no coloration with iodine.—Chem. Centr., through Journ. Chem. Soc., lxvi., 107.

Cellulose in Bacilli and Other Fungi.—I. Dreyfuss. The organisms investigated were, Polyporus, Agaricus campestris, Bacillus subtilis, pus bacilli, and Aspergillus glaucus. It was found that all contain "true cellulose," in E. Schulze's sense. The presence of hemi-cellulose is very doubtful. Cellulose was also found in caseating lymph glands; and thus an observation of Freund's is confirmed. It doubtless is due to the bacilli in the tuberculous deposits.—Zeit. physiol. Chem., 1893, 358; Jour. Chem. Soc. (Abs.), 1894, 24.

Tunicin.—E. Winterstein. Tunicin, or animal cellulose, agrees in nearly all its properties with vegetable cellulose. It does not show greater resistance to acids than vegetable cellulose, as Berthelot stated. On hydrolysis, it yielded dextrose, and a small quantity of another sugar, which was not identified. This second sugar is, however, not galactose, mannose, or pentose.—Zeit. physiol. Chem., 18, 43–56; Jour. Chem. Soc. (Abs.), 1893, 497.

Solvents of Cellulose.—T. F. Hanausek has experimented with the new solvent of Cross and Bevan (zinc chloride in 2 parts by weight of acetic anhydride) and finds that no solution like that of cuprammonia solvent is produced, but that it is however an excellent reagent for showing the structural relations of the cell-wall.—Chem. Zeit.; Chem. News, 1894, 174.

Decomposition of Liquids by Cellulose.—C. Beadle, referring to Gore's recent work on the decomposition of liquids by powdered silica, suggests that the properties ascribed to silica are probably shared, under some conditions, by colloids in general, and he states considerations which seem to indicate that cellulose also exhibits well the phenomena of solid solution. If cotton wool be placed in a solution of a metallic salt it abstracts a certain amount of the latter, the exact proportion depending upon similar conditions to those obtaining in the case of silica. On dilution with water some of the salt dissolved by the cellulose re-dissolves in the liquid, but not always the full amount. In the case of ferric salts, for example, dissociation probably takes place, and the insoluble base is retained by the cellulose, though the acid is dissolved out.—Phar. Jour. Trans. 1894; from Nature, 1894, 457.

Nitrocellulose Process.—A patented process consists in first producing hydro- or oxy-cellulose by subjecting air-dried rags or bleached fibers to the action of hydrochloric acid gas in a closed chamber, after which the rags or fibers are washed free from acid by means of water, and then dried and dissolved in concentrated nitric acid to form a clear, gummy solution. Compounds of various degrees of nitration can be obtained from this solution by precipitating with water to obtain the nitrates, and with sulphuric acid to obtain the higher nitrates.—West. Drug., 1894, 98.

Gun-Cotton and Collodion when Dry.—In manufacturing gun cotton and collodion (especially the former) it is a rule that after the cotton has been nitrated, every trace of free nitric acid must be removed from it by long and careful washing, as otherwise it will be very likely to explode while drying. With the view of shortening this part of the process, C. O. Weber made use of water containing a small quantity of ammonia. Pyroxylin (which thus acquired a yellowish tinge) was then pressed between sheets of filter paper, and dried at 70° C. In three hours a violent explosion took place. This could not have been caused by the temperature, since gun-cotton does not detonate below 160° to 170° C. Weber regards it as due to ammonium nitrate, formed between the nitric acid of the cotton and the ammonia in the water. If a strong solution of this salt, with a little acetic acid, be evaporated over a water-bath, spontaneous combustion—caused by the hydrogen of the ammonia uniting with the oxygen of the nitric acid—will occur when a certain stage of condensation has been reached. The ammonium nitrate in this case operates like tinder. Its presence, therefore, in any nitrated product, must be highly dangerous.—Drug. Circ., 1893, 251.

Action of Zinc on Chlorocamphor—Relation between Camphor and Carvacrol.—A. Étard. When monochlorocamphor mixed with about 10 per cent. of zinc chloride is boiled without distillation until evolution of hydrogen chloride ceases and is then distilled, carvacrol is obtained in quantity corresponding with 65 per cent. of the calculated yield. At the same time some carbonic oxide is evolved and a hydrocarbon, C_9H_{16}, is formed. Chlorocamphor seems to behave as a hydrochloride of carvacrol, and in this respect is strictly analogous to carvol hydrochloride. It follows that camphor may be regarded as a hydrocarvacrol, and the fact that it does not dissolve in alkali is not surprising in view of the fact that the phenolic function of carvacrol itself is very weak, and is necessarily diminished by hydrogenation.—Comp. Rend., 116, 1136–1139.

Detection of Chloral Alcoholate in Chloral Hydrate.—By warming 1 Gm. of chloral hydrate with 1 C.c. nitric acid (specific gravity 1.38), pure chloral hydrate will give a colorless mixture; 10–20 per cent. alcoholate in the hydrate produces a yellow coloration, without the application of heat, in from 3–5 minutes; upon heating the color appears after a few seconds; 5 per cent. alcoholate will not give the reaction in the cold, but immediately upon warming; 1 per cent. alcoholate, after 3–4 minutes' heating, develops the color, followed after about ten minutes by the evolution of yellow fumes. The test for alcoholate may be formulated as follows: 1 Gm. of the chloral hydrate covered with 1 C.c. nitric acid (sp. gr. 1.38) should not, at ordinary temperature or after warming, produce a yellow colored mixture or emit yellow vapors.—E. Hirschsohn, Pharm. Ztschr. f. Russl., 1893, 817; Amer. Jour. Pharm., 1894, 141.

Chloroform.—It seems to have been ascertained that the chief products in the decomposition of chloroform are carbonyl chloride, hydrochloric acid and chlorine. David Brown contends that chloroform containing alcohol decomposes under given conditions, producing these products even while alcohol is present in the decomposing chloroform. Carl Schacht, of Berlin, and E. Biltz, of Erfurt, confirm Mr. Brown's observations, but state that in the presence of alcohol these bodies interact with the latter, forming harmless products. Consequently so long as any alcohol remains unconsumed, only hydrochloric acid can be detected in place of free chlorine. Moreover, they attribute the well-known preservative action of alcohol in chloroform to this fact. Mr. Brown (Pharm. Jour. Trans., 1893, 321) takes exception to these statements and declares them to be contrary to his experience. He concludes that the preservative action of alcohol must be ascribed to some other cause, and that it is folly to arrest decomposition altogether in chloroform by the excessive addition of alcohol. Without doubting in the least degree Mr. Brown's statements that pure chloroform to which 0.077 per cent. of alcohol had been added, decomposes when exposed in colorless glass to direct sunlight, Dr. Squibb (Ephem., Jan., 1894) calls attention to his experience that pure chloroform to which 0.625 per cent. of alcohol had been added, in ground-stoppered bottles of amber glass, has kept for at least ten years without any trace of decomposition.

One of the most recent tests in detecting decomposing chloroform is that proposed by Prof. W. Ramsey (see U. S. P., 1890) in the use of baryta water. Mr. D. B. Dott has not found this, however, to be satisfactory. Mr. Brown relies wholly upon the zinc-iodide and starch test in detecting the first signs of decomposition in chloroform. He also says that by increasing the quantity used for the foreign odor test and diminishing the quantity of sulphuric acid to 10 per cent. in the acid test, that a very large quantity of impure chloroform is detected, which by the usual methods of testing would pass into consumption.

Discovery of Chloroform.—Ossian Guthrie gives the data regarding Dr. Guthrie's discovery of chloroform and other chemical investigations.—West. Drug., 1894, 51; Apothecary, 1893, 24.

Chloroform—Decomposition of.—Biltz has recently observed that chloroform conforming to the requirements of the Ger. Phar. may be exposed to light, either in colorless, blue or amber vials, without the liberation of hydrochloric acid, even after a lapse of six months. The presence of a little water, however, will eventually give rise to the formation of hydrochloric acid in chloroform exposed in colorless glass.—Therap. Monatsh., 1894; West. Drug., 1894, 97.

Pure Chloroform from Salicylide Chloroform or Orthohomosalicylide Chloroform.—R. Anschütz. Both salicylide and orthohomosalicylide form with chloroform compounds that crystallize well. In them the chloroform is in a state of unstable equilibrium and may be obtained at a gentle heat. Ann. der Chem., 1893, 94.

Chloroform—The Tests for.—D. B. Dott, after reviewing the tests for sp. gr., carbonyl chloride and the color test with sulphuric acid, suggests the following: A dense liquid of characteristic odor. Specific gravity 1.490 to 1.495. On allowing ½ fl. drm. to evaporate from a clean surface, no foreign odor is perceptible at any stage of the evaporation. When 1 fl. drm. is agitated with an equal volume of solution of silver nitrate, no precipitate or turbidity is produced after standing for five minutes. On shaking up the chloroform with half its volume of distilled water, the water should not redden litmus paper. When shaken with an equal volume of sulphuric acid, little or no color should be imparted to the acid.—Pharm. Jour. Trans., 1894, 629.

Chloralose.—Petit and Polonovski give the rotatory power of α-chloralose, in five per cent. solutions at a temperature of 20° to 22° C. as follows: In 98 per cent alcohol $[a]_D = +19^\circ.4$; and in 4 per cent. potash solution $[a] = +15^\circ$. The rotatory power of β-chloralose has not yet been determined. It is also found that the addition of traces of either compound to Fehling's solution, and then heating to boiling point, causes an almost immediate change of color, accompanied by precipitation of the copper salt. Both α- and β-chloralose are freely soluble in potash solution, and on heating they are decomposed, the elimination of chlorine being almost complete after an hour's boiling. Sodium carbonate also attacks chloralose when heated, sodium chloride and carbon dioxide resulting. With barium hydrate formic acid is one of the products of decomposition; with dilute sulphuric or hydrochloric acid chloral and glucose are liberated; and a similar result is brought about more slowly by the action of water. In the case of β-chloralose the reactions take place less quickly relatively, on account of its weak solubility.—Jour. Pharm. Chim., 1894, 396.

——— M. Hanriot and Ch. Richet. A reply to revision of their memoir by Petit and Polanowsky. The authors submit that the work of the chemists named confirms their experiments and their formula, and brings forward an interesting fact, *i. e.*, the decomposition of chloralose into its constituents by the prolonged action of relatively concentrated acids.—Bull. Soc. Chim. de Paris, xi.–xii., No. 7.

Chloralose and Parachloralose.—In a supplementary communication regarding these substances, Hanriot and Richet describe the first-named as slightly soluble in water and in ether, more so in alcohol, and melting at 187° C. The aqueous solution does not reduce silver nitrate nor Fehling's solution even when boiling. Dilute acids fail to decompose it, and nascent hydrogen is also without action upon the solution, but alkalies color it brown on warming. Concentrated acids or their chlorides act upon chloralose, forming di- and tetra-substituted ethers. Tetracetyl-chloralose, $C_8H_7Cl_3O_2(C_2H_3O_2)_4$, melts at 145° C.; tetrabenzoyl-chloralose forms prisms which fuse at 138° C. By oxidation, chloralose is converted into chloralic acid, $C_7H_9Cl_3O_6$, with loss of carbon dioxide. The acid crystallizes in anhydrous needles, which fuse at 212° C., are soluble in alcohol or ether, and slightly so in water. All these derivatives of chloralose are physiologically inactive. Parachloralose is distinguished from the former compound by its insolubility generally; it melts at 227° C., and sublimes if heated gently. Alkalies attack it on boiling, but not powerfully. Like chloralose, it is unaffected by hydroxylamine, phenylhydrazine and dilute acids, and it gives di- and tetra-substituted ethers under similar conditions. Tetracetyl-parachloralose, $C_8H_7Cl_3O_2(C_2H_3O_2)_4$, occurs as long needles, melting at 106° C., and boiling near 250° C., under a pressure of 25 Mm. It can be distilled at the ordinary pressure, but is colored yellow during the operation. Tetrabenzoyl-parachloralose has not yet been obtained in the crystalline state. By oxidation of parachloralose, parachloralic acid, $C_7H_9Cl_3O_6 2H_2O$, is formed, and CO_2 given off. This acid melts at 202° C., is slightly soluble in cold water, and very soluble in alcohol or ether. It crystallizes in efflorescent tablets.—Comp. Rend., cxvii., 734.

Choline, Neurine and Allied Compounds.—E. Schmidt communicates an interesting paper (Ann. der Chem., Vol. 267) on the relations existing between the chemical and physiological character of these compounds. For on comparing the chemical constitution of tri-methylamine derivatives with their physiological action it is evident that apparently slight chemical differences are accompanied by essential differences in their action upon the animal organism. Thus choline ($C_5H_{15}NO_2$) and betaine ($C_5H_{13}NO_3$) are comparatively innocuous, while muscarine ($C_5H_{15}NO_3$) and neurine ($C_5H_{13}NO_3$) are intensely poisonous.—Abstract in Pharm. Jour. Trans., 1893, 121.

Manufacture of Ethyl Ether and its Homologues.—The manufacture by the intervention of aromatic sulphonic acids and based upon extensive research is announced by Krafft. The alkyl esters of sulphonic acid, like the alkyl sulphuric acids, possess the property of forming ethers when heated with alcohols; these reactions are expressed as follows:

$$HO.SO_2OC_2H_5 + C_2H_5OH = HO.SO_2.OH + C_2H_5.O.C_2H_5$$
$$C_6H_5.SO_2.OC_2H_5 + C_2H_5OH = C_6H_5.SO_2.OH + C_2H_5.O.C_2H_5$$

Sulphuric acid, as is well known, readily gives up oxygen to oxidizable substances, to which class alcohol belongs. In the sulphonic acids like $C_6H_5.SO_2.OH$ the hydroxyl group of the sulphuric acid, which does not take part in the etherification of the alcohol, is replaced by strong radicals like phenyl, naphthyl, etc., which are strongly united with the sulphonic group, in consequence of which these sulphonic acids show a marked stability towards the alcohols towards which they do not act as oxidizing agents but simply as etherifying agents. Sulphuric acid, upon heating, only reluctantly gives up water, and the gradual taking up of more water in the manufacture of ether finally prevents the etherification of the alcohol; the disadvantage is notably reduced by the use of the sulphonic acids, which give up the water much more readily than does the sulphuric acid. In the preparation of ether and its homologues the sulphonic acid is heated to the proper temperature and the alcohol allowed to run in; the distillate consists of ether, water and unchanged alcohol: the sulphonic acid is always regenerated and can be used for unlimited periods. The process is illustrated by the reactions:

$$C_6H_5.SO_2OH + C_2H_5OH = C_6H_5SO_2OC_2H_5 + H_2O$$
$$C_6H_5SO_2OC_2H_5 + C_2H_5OH = C_6H_5SO_2OH + C_2H_5OC_2H_5$$

Experiments have proven that benzene-sulphonic, benzene-disulphonic, *p*-toluene-sulphonic, β-naphthalene-sulphonic acids, or their esters, are suitable for the manufacture of ethers. Benzene sulphonic acid has, without loss of its activity, been used in converting one hundred times its weight of alcohol into ether; under favorable conditions several thousand times its weight of alcohol can be converted into ether. This process, the most continuous of all artificial processes, has another advantage in its practical application, namely, the purity of the products.—Chem. Ztg., 1893, 1876.

Carbonic Esters of Pyrocatechin and its Alkyl Ether.—These compounds are obtained by v. Heyden by acting on pyrocatechin, its mono-alkyl ether, or the methyl ether of homopyrocatechin with phosgen under pressure and in presence of an indifferent solvent, such as benzol—

$$2C_6H_4.OH.OC_2H_5 + COCl_2 = CO(OC_6H_4O.C_2H_5)_2 + 2HCl.$$

The substances thus obtained are colorless, insoluble in water, soluble in alcohol or ether, and are distinguished from free phenols by their neutral reaction, the absence of corrosive action on the skin, and of taste or smell. They are, therefore, susceptible of useful application medicinally, as they are decomposed in the organism with the corresponding phenols. —Pharm. Jour. Trans., 1894, 730.

Decomposition of Ethylene.—V. B. Lewes reports that the text-book equations representing what occurs when ethylene is decomposed by heat are probably incorrect. He finds that when the gas is passed through a heated tube no change is observable until a temperature of 800° C. is reached. Traces of acetylene are then observed, and this compound increases in quantity between 800° and 900°, large quantities of methane being also produced, together with liquid products:

$$3C_2H_4 = 2C_2H_2 + 2CH_4.$$

Hydrogen begins to appear and carbon is deposited near 1200°, the formation of oil decreasing until near 1500°, when the decomposition of the ethylene is practically complete, the products of decomposition being chiefly hydrogen, with some undecomposed methane and deposited carbon:

$$C_2H_4 = C_2 + 2H_2.$$

Between the primary and final decompositions represented by the above equations a large number of interactions occur, being due to the polymerization of the acetylene formed from the ethylene, and also from the methane as follows:

$$2C_2H_4 = C_2H_2 + 3H_2.$$

Further heating of the decomposition products of ethylene results in the formation of ethane. This is decomposed at 900° C., into ethylene and hydrogen, thus:

$$C_2H_6 = C_2H_4 + H_2.$$

—Pharm. Jour. Trans., 1894, 815.

Esters of Nitrous Acid.—Bertoni (Boll. Chem. Farm., 1894, 8) reports on the preparation of a number of nitrous ethers, some of which have not hitherto been described. The first of these is that of furfurol alcohol, $C_4H_3O.CH_2.O.NO$. To 25 Gm. of pure furfurol alcohol (B. P., 168° C.), kept cold with ice and salt, are gradually added 18 Gm. of the nitrous ester of glycerin. Double decomposition gradually takes place, and after purification, the ester is found to be a yellowish fluid of specific gravity = 1.165 at 11° C., soluble in ether, chloroform and glycerin. With methyl and ethyl alcohol, double decomposition takes place. The ester of isobutylene glycol was prepared in a similar way. It is a liquid of specific gravity = 1.092 at 0° C. and boils at 128° C., insoluble in water. The nitrous ester (as it is described—it is, however, not an ether at all) $CCl_3CH(O.NO)_2$ is prepared by the action of two molecules of glycerin nitrite on three molecules of chloral. The resulting oil boils at 70–75° C. with the formation of nitrogen oxides and chloral. The esters of glycol-chlorhydrin, dichlorhydrin and cetyl alcohol are also described.—Brit. and Col. Drug., 1894, 603.

The Decomposition of Nitrous Ether.—This can be reduced to a minimum, says Meldrum, by the addition of at least 20 per cent. of glycerin.—Amer. Drug. and Pharm. Rec., 1894, 246.

Gallic Blue or Tannin-Indigo—Constitution of.—P. Cazeneuve. When nitrosodimethylaniline is heated with gallanilid in presence of acetic acid, alcohol, or other solvent, it yields a brilliant olive-green coloring matter, insoluble in water or in alkali, but soluble in aniline, from which it can be crystallized. This compound dissolves in concentrated sulphuric acid, forming a blue-violet solution, and, on addition of water, a deep violet precipitate is obtained. When 5 parts of this olive-green product are heated with 20 parts of alcohol and 20 parts of a 40 per cent. solution of sodium hydrogen sulphite, a soluble sodium salt of a sulphonic derivative is obtained. The relation of the sulphonic derivative and the insoluble green compound to gallocyanine is shown by graphic formulæ. Gallocyanine is an oxindophenol, and gallic blue is derived from it by the substitution of

$NH.C_6H_5$ for an oxygen atom in the carboxyl group.—Compt. rend., 116, 884–887.

Action of Bases on Glucoses.—L. Jesser. Baryta acts on invert sugar like calcium oxide; the acidity of the acids obtained from 2 mols. of the sugar is equivalent to 1½ mols. of baryta, and they liberate carbonic anhydride from alkali carbonates. The quantity of carbonic anhydride evolved on heating calcium hydroxide with lævulose and invert sugar stands in molecular relationship to the amount of the levulose; practically none is evolved from the glucose (dextrose). The decomposition products of invert sugar, on titration in acid solution, exert no action on indicators, but on boiling with alkalies and acidifying, acids are liberated which affect phenolphthalein considerably, litmus less, and corallin scarcely at all, these acids are neutralized by boiling with acids, and in their general relationship they show a striking similarity to γ-lactones.—Chem. Centralb., 1894, 20; from Osterrung Zeit. Zucker-Ind. Landw., 1893, 661.

Baryta on Glucose and Lævulose—Action of.—M. H. Courtonne. A neutral, colorless solution of invert sugar (17 Gm. in 100 C.c.) when slowly heated with an equivalent amount of baryta or strontia to the boiling point, gives an abundant, slightly colored precipitate at 70° C., which disappears in a few minutes, yielding a strongly-colored solution, which is not precipitated by carbonic anhydride, nor does it reduce copper solution. When twice or three times the amount of the bases are employed, the precipitate becomes brown and is only partly dissolved. In both cases the invert sugar is completely destroyed.

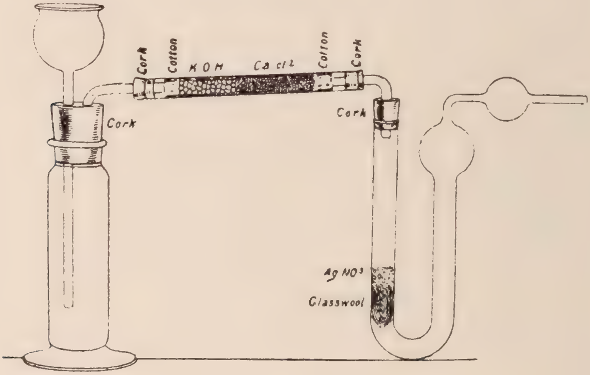
The different results obtained by Beaudet, who found that glucose and lævulose are not precipitated either by hot or by cold baryta, and by Beaufret, who found that glucose is partly precipitated and partly destroyed, were probably due to the strength of the solutions not having been taken into account.—Bied. Antr., 1893, 210; from Sucrérsie indig. et colon., 1894, 156.

Distillation of Anhydrous Glycerin.—The presence of water-vapor in distilling glycerin has always been considered necessary in order to prevent the decomposition of the glycerin, which always takes place if it be heated when diluted. The steam has been assumed to envelop the glycerin and carry it through the apparatus at a temperature much below the boiling point of the latter, and also to prevent oxidation by contact with air. Jaffé and Darmstaedter claim to accomplish the same result by distilling the pure glycerin in a current of air, the air apparently acting in manner similar to steam and preventing decomposition. Distillation begins at 120° C. and is active at 178°–180°. The yield is quite as large as when steam is used, said to be purer, and is, of course, more nearly anhydrous. Re-distillation can be accomplished without dilution.—New Eng. Drug., 1894, 292.

Arsenic of Glycerin.—H. Paul and Cownly have detected small quantities of arsenic in commercial glycerin. Of 8 samples examined 4 were found to contain arsenic. In two of these the quantity found was about 0.05 Gm. in 5,000 Gm. glycerin. Gutzeit's method as modified by Siebold was used in detecting the arsenic. They suggest that a blank experiment be first made, as zinc and hydrochloric acid may contain arsenic — Pharm. Jour. Trans., 1894, 585.

——— J. B. Nagelvoort proposes to conduct the current of H., developed from a small amount of zinc, over finely pulverized silver nitrate, packed over glass wool, in a U tube. The details of this entirely safe way of performing Gutzeit's test for arsenic were fully described by the author a few years ago (Pharmaceutische Rundschau, 1891, p. 286; Fresenius, Zeitschr. f. Analytische Chemie, vol. xxxi., p. 728). The apparatus is a very simple affair, and can be kept on a shelf ready for use, and may be left alone when in use. The following illustration needs no comment; all connections to be of cork; no rubber stopper or tubing.

FIG. 48.



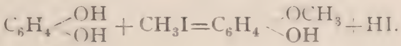
—Pharm. Rund., 1894, 109; Bull. Pharm., 1894, 157.

Arsenical Glycerin.—Fairley states that out of eight samples of glycerin recently analyzed by him, five were found to contain appreciable quantities of arsenic. The presence of arsenic in glycerin attracted considerable attention some short time ago, and manufacturers of this article took pains to show that provision was made for avoiding this contamination, but from Fairley's report it appears that this has not been effectually accomplished. It is therefore desirable that chemists should take steps for ascertaining the purity of their glycerin and its freedom from such an objectionable contamination as arsenic.—Pharm. Jour. Trans., 1894, 588.

Valuation of Commercial Glycerin.—The following method, based on the formation of triacetin, is recommended by Heller: 1.5 to 2.0 Gm. of the commercial glycerin is heated with glacial acetic acid and sodium acetate for about two hours with a reflux condenser, and the excess of acetic acid is neutralized exactly with soda. A measured quantity of soda is now added, the triacetin is saponified, the quantity of soda left is determined by tritration with standard acid and the amount of glycerin is thus calculated.—West. Drug., 1894, 99.

Study upon the Methods of Determining Glycerin.—E. Suhr (Arch. f. Hygiene, xiv., 305) has experimented with the following methods in the determination of glycerin, especially in fermented liquors: Diez (Zeitschr. f. Anal. Chem.), von Torring (Ibid.), Planchow (Ibid.), Reich's method. —Zeitschr. f. Anal. Chem., 1893, 486.

Guaiacol.—This constituent of beechwood creosote is now prepared synthetically by the reaction of methyl iodide with pyrocatechin:



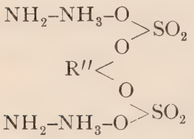
$$C_6H_4{<}^{OH}_{OH} + CH_3I = C_6H_4{<}^{OCH_3}_{OH} + HI.$$

Merck describes the product as melting at 33° C. and boiling at 205° C. A one per cent. alcoholic solution mixed with a few drops of two per cent. solution of ferric chloride and dilute hydrochloric acid becomes immediately blue, then green and yellow. The amount of guaiacol in the commercial article known by this name does not appear to be more than about 30 per cent.—Merck's Ber., 1893.

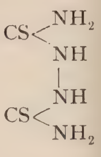
Absorption of Guaiacol.—Linossier and Lannois (Jour. Pharm. Chem., 1894, 482) show that guaiacol is very rapidly absorbed by the skin, glands, lungs, etc. The best results are stated to have been obtained by painting doses of 4 Gm. upon the skin, the absorption being then equal to 55 per cent. With a much stronger dose not more than 35 to 37 per cent. is eliminated, and there is then some risk of poisonous effects being produced.

Characteristics of Guaiacol.—H. Thoms describes the characteristics of crystallized synthetic guaiacol. He agrees with Behal and Choay that the crystals melt at 28.5° C., boil at 205° C., and that the specific gravity is 1.1365 at 19° C. Generally it is stated that sp. gr. 1.117 at 15° C. is the factor for pure guaiacol, and that its solubility in water is 1 in 200; but Thoms says that these factors are wrong. He finds the solubility in water to be 1 in 50. Ten C.c. of a 1-per-cent. alcoholic solution of synthetic guaiacol gives with a single drop of ferric-chloride solution (10 per cent.) an emerald-green color; 1 drop of ferric-chloride solution diluted with water ten times gives a blue color which quickly changes to emerald-green. A drop of this diluted ferric-chloride solution with 0.1 C.c. of 0.5 per cent. aqueous solution of guaiacol gives an evanescent blue color changing to brownish-red. On standing this becomes dark brown. A similar brownish-red color is obtained by adding a few drops of potassium-chromate solution and excess of hydrochloric acid to 10 C.c. of the watery solution. A cherry-red color is produced by mixing with the aqueous guaiacol solution a few drops of hydrochloric acid followed by a little potassium-permanganate solution. This also becomes brownish-red on standing. Bromine water gives a red-brown precipitate. Small crystals of guaiacol give a colorless solution with concentrated sulphuric acid in the cold, but on heating the solution becomes yellow, green, and finally red-brown. In the course of the discussion on this paper Kinzel stated that he had found 1 in 60 to 1 in 70 to represent the solubility of guaiacol in water.

Hydrazine.—F. Schrader shows that the hydrate of this compound, $N_2H_4.H_2O$, decomposes sooner or later, even when enclosed in sealed tubes, ammonium hydrate being the chief product formed. He also describes a series of double sulphates with the general formula $R''SO_4$-$(N_2H_4)_2.H_2SO_4$, where R″ may represent copper, nickel, cobalt, iron, manganese, zinc, or cadmium. They contain no water of crystallization, dissolve with difficulty, and may be prepared by simply mixing solutions of the constituent sulphates. The accompanying formula probably represents the constitution of the double salts. Double chlorides of fixed composition were only prepared with difficulty. A new compound of hydrazine was prepared by saturating the hydrate with sulphocyanic acid, or by decomposing the sulphate with barium sulphocyanate. The resulting hydrazine sulphocyanate, $N_2H_4.HSCN$, is described as a deliquescent substance, melting at 80° C. On heating it four or five hours in a sealed tube at 100°, another new compound, of urea-like constitution, was formed, hydrazine sulphocarbamide. This is described as crystallizing from a hot aqueous solution, melting at 214°–215° C., and possessing acid properties.—Chem. Zeit., 1893, 1243.



$$\begin{array}{l} NH_2\text{–}NH_3\text{–}O \\ \qquad\qquad\quad O \end{array}\!>SO_2 \quad R''<\begin{array}{l} O \\ O \end{array} \quad \begin{array}{l} \qquad\qquad\quad O \\ NH_2\text{–}NH_3\text{–}O \end{array}\!>SO_2$$



$$\begin{array}{l} CS<\begin{array}{l} NH_2 \\ NH \end{array} \\ \qquad | \\ CS<\begin{array}{l} NH \\ NH_2 \end{array} \end{array}$$

Iodoform.—When iodoform is dissolved in liquid cacao butter, and the mixture allowed to solidify, exposure to the light will soon cause a reddish coloration. H. Barnouvin finds that white fluid preparations show this change even in the dark; solid iodoform preparations remain unaltered indefinitely if exposure to the light is avoided.—Rép de Pharm., 1893, 51.

Moist Iodoform.—Vulpius mentions in the Pharm. Centralh., 1894, that he has met with an iodoform which lost 13 per cent. of water in the exsiccator. Pure iodoform loses not more than 1 per cent. of its weight under the same circumstances. The loss of water in the former case was corroborated by a direct iodine determination.

Modern Iodoform.—L. F. Stevens reviews the subject of manufacture of iodoform, and gives the following formula based on molecular weights:

Solution No. 1.

3KI 496.8	49.68
$CH_3—CO—CH_3$ 58.0	5.80
2NaOH 80	8.00
Water, 10,000	1000

Solution No. 2.

3NaClO 223.50	22.35

in dilute solution as contained in solution of chlorinated soda, U. S. P., 1870, the best.

$$3KI + 2NaOH + (CH_3—CO—CH_3) + 3NaClO = 3NaOI + 3KCl.$$

$3NaOI + (CH_3—COCH_3) + 2NaOH + 3KCl = CHI_3 + (CH_3—CO_2—Na) + 4NaOH + 3KCl +$ other sodium salts present in solution No. 2, as chlorides, carbonates, and so forth, these being in variable quantities.

Then 297.8 of theoretical iodine in the salt and 15 of the methyl from the acetone, less two hydrogens = 13, yield 392.8 of iodoform, and of this the workers say that 98 per cent. can be reclaimed in the long run, and as all side products formed are soluble in the mother liquor and also in water, the precipitate is easily washed and requires no further treatment.—Amer. Drug. and Pharm. Rec., 1894, 300.

Diiodoform.—This is described by Maquenne and Taine as a definite iodide of carbon, ethylene periodide, C_2I_4, prepared by treating acetylene periodide, C_2I_2, with iodine in excess. It is insoluble in water, but soluble in chloroform, carbon bisulphide, benzin, etc., and slightly so in alcohol or ether. It crystallizes in fine yellow prismatic needles, very different in appearance from those of iodoform. It melts at 192° C., is almost inodorous, and is recommended as a substitute for iodoform for antiseptic purposes. Exposure of the compound to light appears to result in dissociation to some extent, and it is accordingly recommended that it be kept in yellow or red glass bottles.—Jour. Pharm. Chim., 1893, 525; Rép. Pharm., 1893, 529.

Constitution of Magentas.—A. Rosenstiehl (Bull. Soc. Chim. de Paris, 1893, No. 22). Rosaniline is an alcohol and an amine, and forms salts. It combines in its molecule these two functions, and hence forms with the acids two series of combinations. One of these series contains the characteristic grouping of the ethers, and the other that of salts.—Chem. News, 1894, 12.

Paramagenta.—A. Miolati. Pararosaniline is a stronger base than quinaldine, and its salts undergo electrolytic dissociation in aqueous solution; so that the formula proposed by Rosenstiehl and V. Richter cannot be correct.—Ber. d. Chem. Ges., 1893, 1788.

Paraxylene, Action of Bromine Upon.—J. Allain Le Canu has successively obtained tolylene tribromide in orthorhombic laminæ, melting at 116° C., the aldehyde alcohol, an oily liquid, feebly aromatic, very soluble in ether, and a hydrazone, solid, of a light yellow, very unstable, and slightly soluble even in boiling water.—Compt. rend., cxviii., No. 10.

Paraffin Estimations.—R. Höland has proven by a series of experiments that paraffin may be quantitatively separated from yellow oil (a product of the dry distillation of brown coal) by treating the sample with 10 times its bulk of commercial absolute alcohol and subsequently cooling in ice-cold water for about two hours. If, however, the amount of paraffin is less than 20 per cent., it is advisable to first remove the bulk of the oil by a fractional distillation.

The precipitated paraffin is collected on a weighed filter contained in a double funnel cooled with ice, and washed with cold alcohol. It is then freed from the bulk of alcohol by squeezing between blotting paper, and finally dried at 100° C. on a weighed watch-glass.—Chem. Zeit., 1893, 1473, 1483.

Solid Paraffin.—The following information is given about the variety of this substance known as "ceresin." It occurs as a white, inodorous, tasteless, microcrystalline mass of sp. gr. .920 to .940; m. p. 74° to 80° C. It is soluble in 35 parts of absolute alcohol, soluble in ether, amyl alcohol, sulphide of carbon, chloroform and benzene. At ordinary temperatures it is unaffected by alkalies, H_2SO_4 and HNO_3. Warmed with HNO_3 it yields fatty acids. It consists essentially of the hydrocarbons nonacosane $C_{29}H_{60}$, cerosane $C_{30}H_{62}$, entriacontane $C_{31}H_{64}$, dotriacontane $C_{32}H_{66}$, and pentriacontane $C_{35}H_{72}$.—Rép. de Pharm., 1893.

Paraffinum Molle.—There has always been considerable mystery as to the origin of vaseline and similar preparations of petroleum, especially in regard to what the "residues" are from which they are made. S. P. Sadtler, in his article on American petroleum contributed to Thorpe's Dictionary of Technical Chemistry, throws light on the matter. The residues in question are what remains in the still after the burning-oils, or lighter fractions, are distilled off in vacuo without cracking. By "cracking" is meant the process in which the heavy oils are distilled at a high temperature, the condensed vapor being returned again to the still. In this process the heavy oils are split up, and a larger yield of burning oil is obtained. Distillation in vacuo is carried out by the use of superheated steam instead of direct firing. The heavy or reduced oils thereby obtained as a residuum are either brought into the market at once without further treatment, or after a bone-black filtration. This production of filtered oils is usually combined with the manufacture of vaseline or of petrolatum, as it is now known in the United States Pharmacopœia. Taking a vacuum residuum as the raw material, this is melted and run on to filters of fine granular well-dried bone-black. The filters are either steam-jacketed or are placed in rooms heated by steam-coils at 120° F. or higher. The first runnings are colorless; and all up to a certain grade of color go to the manufacture of vaseline. Beyond that the filtrate is known as "filtered cylinder-oil" and is used as a lubricant exclusively.—Chem. and Drug., 1893, 319.

Deodorized Petroleum.—Prepared by mixing petroleum with chloride of lime, then adding hydrochloric acid and agitating thoroughly, so as to bring the chlorine gas liberated into contact with the oil. Now treat the decantated oil with freshly calcined lime until all odor of chlorine has disappeared.—West. Drug., 1894, 18.

Determination of Phenol by Method of Chandelon.—L. Zimmerman has carefully subjected the process of Chandelon (Ann. der Chem., xxxviii., 75) to a critical examination, and proposes the following modifications: The aqueous phenol is added to aqueous potassium hypobromite until the latter ceases to discolor starch paper impregnated with potassium iodide and sodium carbonate, the titre of the hypobromite having been found by a similar experiment with a solution of pure phenol of known strength. If the dilution of the phenol is not greater than 250 C.c. per Gm., the result may be calculated at once from the volume used, but if greater than this, a correction is necessary on account of the lack of sensitiveness of the indicator. This correction is proportional to the square of the dilution, so that its values lie on a rectangular parabola, $y = ax^2$, when plotted against it. The value of the constant a, corresponding with 20 C.c. of Chandelon's hypobromite, is 0.00434.

The approximate dilution of the phenol solution of which it is desired to ascertain the strength having been ascertained by titration, the value of the correction y is found from the equation and added to the number of C.c. required to saturate the hypobromite, and the actual dilution then calculated. The numbers quoted show very fair agreement. Tables are given to facilitate the correction. For results with tables see Jour. Pharm. Chim., 1894, 105.

The Estimation of Crude Carbolic Acid.—A weighed quantity of the crude acid is saturated with solution of soda (sp. gr. 1.2—1.3), diluted with water, and ether added, and the whole well shaken in a separating funnel. The ether is then separated off and more added; this portion, after being well shaken, is added to the first quantity. The whole is evaporated, leaving the naphthalene, pyridine and anthracene, which it has dissolved out. The remaining watery solution is then treated with slight excess of sulphuric acid, and the now liberated phenols are dissolved out with fresh ether, the ether evaporated and the product weighed. This includes the phenol, cresol, and any resin soluble in soda that may be present.—Pharm., Zeit., 1893, 116.

Estimation of Phenol.—Carre's colorimetric method depends upon the conversion of phenol into picric acid, and comparison of the solution with a standard one. The process is conducted as follows: 10 Gm. of pure phenol is weighed and made up to 1 litre with distilled water, and from this solution others containing 5, 4, 3, 2, 1, 8, 6, 4, 2 and 1 Gm. of phenol are prepared. Twenty-five C.c. of the solution containing the phenol to be estimated (taken after dilution, if necessary) is heated in a small flask on a steam bath for one or two hours (generally 1 hour). Five C.c. of nitric acid is added, and, the standard solutions being treated the same, a preliminary trial shows which of the standard solutions approximates to the sample being tested. To obtain greater accuracy 20 C.c. of soda solution is added to the contents of the flask after heating, and the liquid is made up to 50 C.c., filtered, and compared in a colorimeter with the standard solution to which it is the nearest in tint. H. E. Carpenter (New Eng. Drug.) concludes that for the use of the pharmacist it is a most excellent method, and one that, with little apparatus and little time needed, is productive of the most satisfactory results.

Cresol or Xylenol—Estimation of.—F. Keppler.—A mixture of potassium bromide and bromate is added to the solution containing the cresol. After adding a sufficiency of sulphuric acid, the liquid is filtered through glass wool, and an aliquot part of the filtrate is titrated, as usual, by means of potassium iodide and sodium thiosulphate with starch as indicator.—Chem. Centralb., 1893, 892; from Arch. Hygiene, 1893, 51.

Acidum Carbolicum Liquefactum, B. P.—Peter Boa replaces a portion of the water by rectified spirit with good results. 100 parts carbolic acid, 7½ parts water, and 2½ parts rectified spirit, give a liquefied carbolic acid that remains fluid in the shop bottle till the temperature falls to about 40° F. A larger proportion of spirit does not appear to serve the purpose better. When this liquefied acid containing 2½ parts spirit in place of 2½ parts of water crystallizes, the resulting mass is less hard and much more easily re-liquefied than the mass which results on crystallization when water only is used to liquefy; it is as snow compared to ice.—Pharm. Jour. Trans., 1893, 511.

——— C. F. Henry obtained the best results by using 90 fluid parts carbolic acid, 7½ fluid parts water, and 2½ fluid parts rectified spirit. In the subsequent discussion it was suggested that the stability of the liquid at low temperatures might be attained by adding 15 per cent. rather than 10 per cent. of water.—Ibid., 746.

Phenol—Cause of the Red Coloration of.—C. A. Kohn. A. Richardson has succeeded in detecting the presence of hydrogen peroxide in reddened phenol, both by the chromic acid and titanic acid tests. The same color is produced, together with a complexity of other substances, when phenol is electrolyzed in acid solution. The nature of the colored product formed is still under investigation, and not until the coloring-matter itself is more completely studied can any conclusion be drawn as to the cause of the oxidation.—Pharm. Jour. Trans., 1893, 215.

Crude Carbolic Acid.—H. W. Jayne considers the manufacture and quality of commercial acids. The U. S. P. acid for disinfecting purposes only, he says, should be required to be not soluble in less than 15 parts water at 15° C., and the aqueous solution should not have an alkaline reaction. It should dissolve in 10 per cent. caustic soda solution, leaving not over 5 per cent. insoluble. Should not show over 2 per cent. water, and 90 per cent. should distil under 225° C.—Amer. Jour. Pharm., 1894, 113.

Official Creosotes of Beech-tar and Oak-tar—Qualitative Compositions of.—A. Béhal and E. Choay.—By official creosotes the authors understand the total phenols which distilover between 200° and 220° C. Qualitatively the two creosotes are identical in composition. They are very complex mixtures, in which they have identified and isolated the following substances: Phenol, orthocresylol, paracresylol, orthoethylphenol, metaxylenol (1.3.4), metaxylenol (1.3.5), guaiacol, creosol and ethylguaiacol. Besides these substances, creosote contains small quantities of sulphur derivatives, probably thiophenole and a body differing from pittacol, but which on exposure to air and ammonia gives rise to a substance which dissolves in alkalies with an intense blue color, and which is reddened by acids. These properties to some extent approximate it to orceine, which Liebermann has shown to be a mixture.—Compt. rend., cxviii., No. 24.

Coal and Wood Tar Products Rendered Soluble in Water.—Hirschsohn has ascertained that 100 parts of the undiluted crude carbolic acid shaken until solution is effected with 50 parts of finely powdered rosin and 6 to 8 parts of soda dissolved in twice its weight of water, gives an almost clear solution when added to 10 parts, by measure, of water. Such a solution is said to bear quite a resemblance to lysol, though, unlike that substance, it does not mix with petroleum ether, nor does it form a gelatinous mass with 2 or 3 volumes of water. When the so-called 50 per cent. crude carbolic acid was employed by him in the experiment, the product was not miscible with water. Different kinds of wood-tar acted differently. Birch tar behaved satisfactorily when treated like the so-called 100 per cent. carbolic acid, but fir tar required altogether different proportions, giving best results with only 10 parts of the rosin and 6 to 7½ parts of soda dissolved in the same proportion in water. Thus prepared, these mixtures do not give a perfectly clear solution with water, but upon long standing they do not separate into different strata. Heat is not necessary to the success of these processes, but is found to be of great help in effecting the solution of the rosin. Oil of turpentine, oil of eucalyptus, and similar oils, may be treated in the same manner. Crude oleic acid is claimed to be equally efficacious with rosin in forming a water-soluble mixture with the so-called

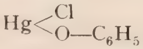
100 per cent. crude carbolic acid, but it did not give good results with the 50 per cent. acid. With birch tar an almost solid mass was obtained, which gave a turbid solution with water after some time, and no change in the proportions employed affected the result any more favorably. With fir tar the oleic acid worked satisfactorily.—Pharm. Zeit. f. Russl., 1893, 657.

Action of Aldehydes on Polyvalent Phenols, Aromatic Acetals.—By the action of aldehydes on phenol either diluted or in acid solution, a molecular combination of a phenol employed is formed; and to designate the combinations the author uses the generic name acetals. The diatomic resorcin phenol of the meta series forms with ordinary aldehyde, ethylresorcinic acetal, in which two molecules of resorcin are combined for one of aldehyde. The same phenol acting upon chloral or upon glyoxylic acid forms one and the same acetal, glyoxylresorcic acetal, the constitution of which resembles the preceding. One molecule of this phenol also enters into combination with pyrogallol, forming ethylpyrogallic acetal.—Causse, in Jour. Pharm. Chim., 1893, 319.

Chloro- and Bromo-Phenols.—Para-chloro-phenol occurs as crystals, M. P. 37° C., B. P. 217°, of a sp. gr. 1.306 at 20.5°, and having an odor recalling that of phenol. It dissolves in water (1 to 2 per cent.), alcohol, ether, or alkalies. Ortho-bromo-phenol is a liquid of a dull violet color, and dissolves in the same liquids as the previous compound, but does not so much resemble phenol in odor. Both compounds have recently been found to yield excellent results in cases of erysipelas when employed in the form of ointment, 1 to 2 per cent. being incorporated with soft paraffin as a basis.—Nouv. rem., ix., 358.

Ethylphenols.—Béhal and Choay find that the compound known as α-ethylphenol is identical with para-ethylphenol, which, however, has nothing in common with the compound described by Errera and Auer. Orthoethyl phenol has a higher boiling point, 202° to 203° C., than is usually attributed to it. Metaethylphenol is a liquid boiling at 214° C., and has a density at 0° of 1.0403.—Comp. rend., cxviii., 422.

Mercurial Phenolates and their Derivatives.—Desesquelle states that on adding mercuric chloride solution to an alkaline solution of phenol in molecular proportions, a substance is obtained having the composition represented by A. By using a large excess of alkaline phenol solution the product has the composition represented by B, and on treating this with glacial acetic acid it is converted into C. Desesquelle has not been suc-

(A) 
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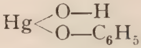
(B) 
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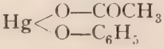
(C) 
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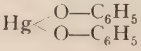
(D) 
$\mathrm{Hg}\Big\langle\begin{matrix}\mathrm{O{-}C_6H_5}\\ \mathrm{O{-}C_6H_5}\end{matrix}$

cessful in obtaining a phenolate having the composition represented by the formula D.—Jour. Pharm. Chim., 1894, 227.

Compounds of Picric Acid with Phenols—Obtained by R. Goedike (Wiad. Farmac., 1893, No. 17), according to the following procedure: The phenol is dissolved in a small quantity of 50 per cent. alcohol and brought into contact with a hot saturated solution of picric acid in 50 per cent. alcohol. The originally yellow liquid assumes at once a red or reddish-brown coloration. The alcohol having been boiled down on the water-bath until the solution became turbid, the whole is left to cool, and the separated crystalline needles are collected on a filter. It is advisable to use an excess of phenol. Phenol picrate forms bright-yellow needles of the formula $C_6H_2OH_2.(C_7H_2[NO_2]_7OH)$, and M. P. 53° C. Of the three isomeric cresols, only the *ortho*-cresol enters into combination with picric acid. Orthocresol picrate occurs in lemon-yellow needles, M. P. at 88° C. and of the formula:

$$2C_6H_4(CH)_3,OH+3(C_6H_2[NO_2]_3.OH).$$

Of the dioxybenzenes, only the *ortho-* modification (pyrocatechin) forms a compound with picric acid. Pyrocatechin picrate forms lemon-yellow needles of the formula:

$$C_6H_4(OH)_2.C_6H_2(NO)_3OH,$$

and M. P. at 122° C. Guaiacol picrate is obtained by shaking guiacol with water and adding it to an aqueous solution of picric acid saturated at 100° C. The lemon-yellow crystals M. P. 86° C. Dimethylpyrogallol picrate has the formula:

$$C_6H_3(OCH_3)_2.OH+C_6H_2(NO_2)_3OH,$$

and M. P. 53° C. The substitution products of the phenols also yield compounds with picric acid. The author has obtained Orthochlorphenol- and Gallacetophenone picrates. The former salt M. P. 81–82° C., the latter at 133° C.

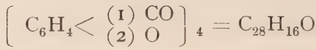
Salicylic Esters of Monochlor Phenols.—Of the three isomeric forms of oxybenzoic acid, the ortho compound, or salicylic acid, is known to have the most decided antiseptic properties, while among the cresols the meta compound is the most powerful, and it was to be expected that the monochlorinated phenols would show similar differences. Karpow has, however, ascertained that the para compound is the most powerful of them. The salicylic esters of two monochlor phenols have been examined with the result that the orthochlor salol (m. p. 53° C.) and parachlor salol (m. p. 71° C.) possess a much greater disinfecting power than salol. They are both colorless crystalline substances, insoluble in water, but readily soluble in alcohol or ether. The solutions give with ferric chloride a reddish violet coloration.—Pharm. Zeit., 1893, 81.

Carbolic Acid Explosion.—An apothecary in Austria placed a bottle of the acid in crystals upon his kitchen-fire plate in order to melt it. The acid was overheated, and, as the stopper was fixed, the bottle burst and enveloped the kitchen-maid in a burning vapor of carbolic acid. She was so seriously injured that she died next day.—Chem. and Drug., 1893, 329.

Phenylhydrazine Reaction upon Lignin and Aldehydes.—Emil Nickel has obtained with hydrazine solutions added to solutions of vanillin, piperonal, paroxybenzaldehyde and salicylaldehyde yellow solutions which upon the addition of HCl formed in the vanillin and salicylaldehyde solutions a yellow precipitate.—Chem. Zeit., 1893, 1243.

Isoquinoline.—Prepared, according to Pomeranz's new method (Wiener Monatsh., 1893), by the condensation of benzaldehyde and amido-acetic aldehyde. On mixing amido-acetal and benzaldehyde, they unite, forming benzylidine-acetal, $C_{13}N_{19}O_2$; and on heating this product with sulphuric acid, isoquinoline is said to be developed.

Preparation of Salicylide and Polysalicylide.—Equal parts of salicylic acid and phosphorus oxychloride are warmed with double the quantity of some indifferent solvent, such as toluol or xylol. The resulting product consists of salicylide and polysalicylide, which can be separated by means of chloroform—salicylide being soluble, while polysalicylide is insoluble in this solvent. Salicylide melts at 260 to 261° C., and has the composition:



$$\left[C_6H_4 < \begin{matrix} (1)\ CO \\ (2)\ O \end{matrix} \right]_4 = C_{28}H_{16}O_8.$$

Polysalicylide melts between 322° to 326° C., and is a polymer of salicylide. Both compounds are converted into salol by continued boiling with caustic alkalies, alkali carbonates, or by treatment with phenol heated to 220° C.—Pharm. Ztg., 1893, 418.

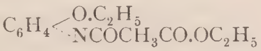
Dithienyl, (C_4N_3S—C_4N_3S)—Obtained by A. Töhl, (Ber. d. Chem. Ges., 1894, p. 665), by oxidizing thiophene with sulphuric acid.

Thiosinamine as a Fixing Agent.—R. E. Liesegang considers this to be a desirable substitute for sodium thiosulphate as a fixing agent. Its aqueous solution removes the silver salt from a silver chloride gelatin plate just as quick as sodium thiosulphate, it is claimed. Bromide of silver dissolves a little slower, but completely. Silver chloride paper-prints are fully fixed after four minutes' immersion in a one per cent. solution. If $\frac{1}{10}$ per cent. solution of gold chloride is added to the liquid, a quick-acting, tone fixing bath is obtained. Aristo pictures treated herewith have greater depths than platinum pictures. Thiosinamine can be mixed with alum or sodium chloride and with an equal quantity of concentrated hydrochloric acid or other acid without decomposition of the salt or reduction of its solvent properties. Concerning the influence of thiosinamine, which remained after insufficient washing, upon the durability of the picture, nothing definite can be said as yet. Several prints, which after fixing, had only been washed superficially, were kept for twenty days without perceiving the slightest change.—Phot. Bull. (Anthony's), 1893, No. 19.

Oxyphenyl Urethanes.—A. Schneegans and v. Mering, in studying the action of various alcohols and their derivatives, observed that the toxic effects and hypnotic action of the compounds differed according as they contained primary, secondary, or tertiary radicals. Their activity was also greater in proportion to the molecular weight. Merck has followed up this observation by preparing compounds of para-amidophenol, and their physiological examination by v. Mering has shown that two of them admit of useful therapeutic application. Neurodin, $C_{11}H_{13}NO_4$, is acetyl para-oxyphenyl urethane—

$$C_6H_4{<}\begin{matrix}OCO.CH_3\\ NH.CO.OC_2H_5\end{matrix}$$

It has the form of colorless crystals, free from odor, melting at 87° C., and slightly soluble in water. It is described as possessing marked antineuralgic properties, being prompt in its action. Thermodin, $C_{13}H_{17}NO_4$, is acetyl para-ethoxyphenyl urethane—



$$C_6H_4{<}\begin{matrix}O.C_2H_5\\ NCOCH_3CO.OC_2H_5\end{matrix}$$

It crystallizes in needles, is free from smell and almost tasteless, melts at 86°–88°, and is sparingly soluble in water. It is an efficient antipyretic, operating within an hour, and has been found useful in cases of influenza. —Merck's Bericht, 1893.

CHEMISTRY (APPLIED).

Alloys.—Lecture by W. Chandler Roberts Austen. Description of various alloys used for art metal-work, including the history of the subject. Gives methods of casting and analyses of two important Japanese alloys. —Engineering, March 24, 1893, and March 31, 1893.

Alloys.—Second Report to the Alloys Research Committee. By W. C. Roberts-Austen. Paper read before the Institution of Mechanical Engineers. The sections deal with the history of the subject and experiments on porosity and the influence of impurities on copper, bismuth, lead and tin.—Engineering, April 28, 1893; also London Iron, April 21, 28, and May 5, 1893.

Albumen of Hen's Eggs.—E. Salkowski. If a solution of hen's egg albumen is carefully neutralized with dilute acetic acid, and the solution precipitated by boiling, a hitherto unobserved albumose is found in the filtrate.—Chem. Centralb., 1893, 5–32.

Determination of Albumen by the Méhu Process.—L. Rurzand suggests a modification which makes it a desirable process for the laboratory also.—Jour. Pharm. Chim., 1894, 364.

Researches upon Some Albuminoid Substances.—M. Arthus has examined the caseines and fibrines.—Jour. Pharm. Chim., 1894, 101.

Albumose.—H. Schrötter has prepared from Witte's commercial peptone an albumose which is soluble in, and crystallizes from alcohol, is practically ashless, and furnishes a hydrochloride of constant composition.—Monatsh., 1893, 612; Jour. Chem. Soc. (Abs.), 1894, 215.

Albumose Food Product.—Somatose, a light yellow powder, prepared from meat. Dose, 10 to 20 Gm.—Amer. Drug. and Pharm. Rec., 1894, 99.

Study on the Ebullioscope and its Use for Determining Alcohol in Beers.—H. Tornöe. The instrument used differs only in detail from that invented by Vidal and Maligand. The movable centesimal scale is replaced by a graduation in centigrade degrees etched on the stem of the thermometer. This modification admits of a strict compensation of errors in the calibre of the thermometer. The author gives a table showing the fall of the boiling-point in proportion to the weight of alcohol in 100 parts of water.—Bull. Soc. Chim. de Paris, xi.–xii., No. 4.

Detection of Saccharin in Beer—Availability of Fluorescein Reaction.—F. Gantter finds that colophonium gives the same green fluorescence with resorcin as saccharin. Hence, this reagent cannot be used for the direct recognition of saccharin in the ethereal extract of beer.—Zeitschr. f. Anal. Chem., 1893.

BUTTER.

Analysis of Butter—Methods of.—Official methods of analysis adopted by the Association of Official Agricultural Chemists (American) at its meeting at Chicago, Aug., 1893.—Reprinted in full in Chem. News, 1894, 283.

Butter—Analysis of.—E. Laves has examined the method of König and Hart, and finds that it does not give more concordant results than the Reichert-Meissl-Wolluy process, but it is more accurate than the other methods. A slight modification was introduced. Instead of boiling in the reflux apparatus for 3–3½ hours, the boiling is continued for ¾ hour only, using 60 C.c. of alcohol and 7.0 Gm. of baryta; 50 C.c. of water (previously heated to 70°–80° C.) is added, the mixture boiled for ¼ hour, diluted with 190 C.c. of hot water, and again raised to boiling. After being partially cooled, it is treated for five minutes with a stream of carbonic anhydride, filtered, again treated with carbonic anhydride, and boiled vigorously for five minutes in a reflux apparatus; it is then quickly cooled to 20° C., filtered, and the barium in the filtrate determined by titration with $\frac{n}{10}$ sulphuric acid, using tropæolin OO as indicator, or, more accurately, by titrating with a solution of potassium dichromate (of strength equivalent to $\frac{n}{10}$ barium chloride) in the presence of alcohol and acetic acid, until a drop of the solution gives a blue color to paper impregnated with tetramethylparaphenylenediamine. Or the barium may be precipitated as sulphate and estimated gravimetrically.—Arch. der Pharm., 1893, 356.

Butter Testing.—E. Spaeth has used a kind of weighing flask, the lid and bottom of which are trebly perforated. The bottom, inside, is covered with asbestos. A glass boat, filled one-third with pieces of pumice the size of a pea, is introduced, and the whole is dried for an hour at 150° C. The boat is taken out and placed on the balance pan alongside the weighing flask and weighed. An average lot of butter, weighing about 10 Gm., is now put into the boat, and the whole is weighed again. The boat is now placed first on an open water-bath for half an hour, then inside an air-bath for about two hours at 100° C. After cooling, it is put inside the weighing bottle, the whole is re-weighed, and the loss represents the water. The fat is estimated by placing the whole apparatus inside a Soxhlet tube, and extracting the fat with ether in the usual manner. The salt may be estimated by digesting the insoluble residue in water, and estimating the chlorine with silver nitrate. The test analyses show the process to be handy and accurate.—Zeitschr. f. angew. Chem., 1893, 513.

Butter Analysis.—C. Viollette. The weight in a vacuum of 1 C.c. of butter at 100° C. varies from 0.86320 to 0.86425 Gm., whilst for margarin the corresponding values are 0.85756 to 0.85865 Gm. The density of a mixture of butter and margarin is exactly the mean of the densities of its constituents. When cows are fed chiefly on hay, the density of the butter is about 0.86320, whilst if the food consists of grains, pulp, cake, and meal, with very little hay, the density of the butter is about 0.86425. Out of 150 samples of butter, two only, derived from cows highly fed with grains, meal and cake, gave densities as high as 0.86538 and 0.86540 respectively, whilst one, derived from a cow fed on straw and hay, had a density of 0.86277. The author has, therefore, constructed a densimeter, giving all the densities at 100° C. comprised between those of pure butter on the one hand and margarin on the other, each unit in the fourth decimal place corresponding to a length of 1.4 Mm. on the scale. The butter to be examined is heated in a cylindrical copper vessel by means of steam. For practical purposes, a series of smaller densimeters are used, which allow first of an approximate, and, afterwards, of a more accurate classification of the butters under examination. Experiments must be made from time to time with average butters from the same district, and from animals fed on various diets. In doubtful cases the butter must be analyzed.—Compt. rend., 1893, 856; Jour. Pharm. Chim., 1894, 116.

Rancid Butter—Amount of Volatile Acids in.—To determine this point E. v. Raumer has examined a sample of butter kept since July, 1888, when it gave a Reichert-Meissl number—26.8 and 26.9. In October, 1889, the butter gave 28.5 and 28.8; in February, 1890, it gave 31.6 and 31.9; and in January, 1892, it gave 30.3 and 30.1. The amount of free fat acids in 1892 was considerable, 100 Gm. of the fat requiring 21.1 C.c. of normal potash solution, but there was no evidence of reduction in the amount of volatile fat acids.—Forsch.-Ber. über Lebensmittel, etc., 1893, 22.

Sulphuric Acid Hydrolysis of Butter-fat.—S. Rideal. The idea of substituting sulphuric acid for alcoholic potash in effecting the saponification of butter-fat has been worked out by Kreis, and also by Pinette, and others. The author has tried the process with very satisfactory results, the figures obtained being practically the same as those obtained by the Reichert–Meissl process. 10 C.c. of sulphuric acid of sp. gr. 1.836 is added to 2.5 Gms. of melted butter-fat. After a few minutes, 100 C.c. of water is added and the mixture shaken, which causes the fatty acids to separate in white flakes. Solution of potassium permanganate is now added until the liquid acquires a pink color, which is permanent for a few seconds. The mixture is then distilled with the usual precautions until 80 C.c. has passed over, and the distillate is titrated with deci-normal soda.—Analyst, 1893, 165.

Natural Butter and Margarin—Discrimination of.—F. Gantter. The method described by the author for the estimation of cotton-seed oil in lard serves equally well for the detection of margarin in butter. The iodine number for genuine butter varies from 13 to 16, when determined by the author's process; that of margarin is variable according to the kind of fat or oil employed in its manufacture, but always much higher, so that an iodine absorption exceeding 16 per cent. would indicate adulteration. Mixtures of butter with ground-nut oil, whose absorption is 49–51, were found to have iodine numbers corresponding with the proportions of the two fats. Genuine butter gives only a straw-yellow to reddish-yellow color, with strong sulphuric acid; most of the oils used in making margarin give a dark-brown color.—Zeitschr. f. Anal. Chem., 1893, 411.

The Prevention of Adulteration of Butter with Margarin.—Soxhlet has proposed, in order to check the adulteration of butter with margarin, that the addition of a small quantity of phenolphthalein to all margarin shall be compulsory. In opposition to his proposal it has been stated that margarin so treated becomes uneatable in eight days. Experiments by F.

Hart show that this is not the case. Fifty Gm. of margarin mixed with four and six milligrammes of phenolphthalein were exposed to light and air for six weeks without any alteration in their quality for edible purposes, while the phenolphthalein was still capable of serving as a means of detecting the margarin when mixed with butter. The author experimented with the toxic dose of phenolphthalein on himself, and found that it required 0.3 Gm. to produce any result. If the quantity proposed by Soxhlet—namely, 2.2 Gm. per cwt. of margarin were used—a toxic dose would be contained only in 13.6 lbs. The author strongly advocates the adoption of the suggestion.—Analyst, after Chem. Zeit., 1894.

The Behavior of Melted Butter as a Test for its Purity.—Dr. Edgar Reich says: If butter melts absolutely limpid it is an almost certain demonstration of its purity. If the butter shows only a slight turbidity, it may also be accepted as pure. In the rare cases where a chemical examination has proven differently the adulterant was margarin. When butter melts with a strong turbidity three conditions are possible, to wit: (1) If the color be normal, or even dark yellow, but the mass have a pleasant buttery odor (which is rarely the case), the butter may be genuine and unadulterated. (2) If the color be normal but the odor be rancid, it may still be genuine, but old; but it is also possible for it to be a mixture of butter and margarin, the rancidity of the former preventing the discovery of the characteristic odor of margarin. (3) If the color is light yellow and the odor suspicious, it may be accepted as a mixture, almost to a certainty. If the melted material be opaque, or nearly so, we may be certain we are dealing with margarin, or a mixture containing at least 50 per cent. of that substance. In the latter case we can determine very nearly which material (butter or margarin) predominates by the odor, which by its approach to the one or the other, will indicate which predominates in the mixture. Of course, in this as in all other cases, a chemical analysis remains the only certain method of proof. One thing is certain, this simple method of testing butter will prevent any one with a little care and experience from accepting an adulterated butter as a pure one.—Milch Zeitung, 1893.

Amount of Lecithin in Butter.—E. Wrampelmeyer.—The ash from 100 Gm. of butter yielded 0.04512 Gm. of phosphoric acid, whilst margarin gave only 0.0160 Gm. Analyses made with filtered fat showed that the ash of margarin treated in this manner contained practically no phosphoric acid, whilst the ash of butter was found to contain much reduced and very variable quantities. The average amount of lecithin calculated on the total phosphoric acid now found was 0.017 per cent. The results of analyses of seven samples is given in a table, which shows also the melting and solidifying points of the butters, and the amounts of volatile fatty acids.—Landw. Versuchs-Stat., 1893, 437.—Jour. Chem. Soc. (Abs.), 1893, 543.

Examination of Butter for Foreign Fats.—A. Cavalli (Pharm. Zeit., 1893) recommends the following process: To about 4 Gm. of the suspected butter, which has been cleansed by melting and filtering, are added, in a test-tube, 0.5 Gm. of copper-filings and 1 C.c. of sulphuric acid (sp. gr. 1.42). The whole is then heated to brisk boiling on a water-bath, and the resulting coloration noted. (*a*) Pure butter assumes at first a more or less greenish-yellow color, which, in the course of an hour, gradually fades into a dirty pale yellow-green. After cooling, this changes to a dark yellowish green. (*b*) Pure margarin shows at first a pale-yellow, gradually deepening into orange (in ¾ of an hour), and reddish (1½ hours). (*c*) Butter with margarin produces a yellow tinge, approaching to orange, according as the proportion of foreign fat is greater; 20 per cent. of margarin is sufficient for this; and on cooling, even smaller quantities impart a deep yellow color to the compound. (*d*) Butter with lard turns reddish half an hour after placing the test-tube in the water-bath, and the color gradually deepens (shown by 10 per cent. of adulteration). Pure lard similarly treated becomes red, darkening into black. (*e*) Butter with beef-suet undergoes no visible color-change, but the author has succeeded in detecting the substitution by observing the lengths of time within which the different products, when cooled, became too solid to run out of the reversed test-tube. In the case of pure butter (the external temperature being 14° C.), this occurred in 35 minutes; whereas butter containing 12 per cent. of beef-suet took only 25 minutes.

Water in Butter—To Determine.—Wibel recommends dissolving the butter in ether saturated with water and pouring this solution into a narrow graduated tube containing a measured quantity of salt solution mixed with some acetic acid and litmus tincture. After mixing the two liquids by inclining the tube up and down and allowing the substance to settle. the increase in volume of the red solution can be read off. This test can be made within the space of a few minutes. Zeitschr. f. Angew. Chem., 1893.

Test for Sesame Oil in Butter.—A. Jorissen calls attention to the fact that butter which is colored with curcumin, but contains no foreign fats, also responds to Baudoin's test, which has been applied for the detection of sesame oil, that is, a violet coloration with hydrochloric acid in presence of sugar; but as it also shows this coloration with hydrochloric acid alone, the filtered fatty body should first be subjected to this test, before applying Baudoin's test.—Jour. de Pharm. d'Anvers, 1893, 321; Amer. Jour. Pharm., 1894, 42.

Artificial Coloring Matters in Butter.—According to a writer in Le Genie Civil, these can be determined by the following tests: If a certain quantity of butter be agitated with alcohol, and after standing for a few minutes the alcohol decanted and evaporated over a flame, the butter will yield nothing to alcohol. If it is colored with annotto the addition of sulphuric acid will cause a red brown deposit. The presence of curcumin will produce a deep red residue with hydrochloric acid, and intense brown with potassium and sodium hydroxides, while subacetate of lead will cause a red precipitate if saffron be the coloring matter, and alkali a green one in presence of carrot, as a coloring agent.—Bull. de la Soc. de Pharm. de Bordeaux, 1893, 189; Amer. Jour. Pharm., 1893, 454.

Sophisticating Butter.—A new swindle has appeared in the form of a "gilt-edged butter compound," which is recommended to farmers for increasing the supply by artificial means. The true nature of the compound is said to be a digestive ferment, probably pepsin, which produces an emulsion with the butter, thereby enabling it to hold about fifty per cent. of water instead of 16 per cent., the normal proportion. To all appearances the butter prepared in this manner is much the same as ordinary butter, except that it is of a softer consistency, and readily undergoes chemical changes, which are probably of a nature to forbid the use of the sophisticated product. The method of procedure is extremely seductive. To a pint of milk, a single pound of soft butter is added, when after proper manipulation two pounds of butter are produced, only ten or fifteen grains of the "compound" being necessary to produce this wonderful transformation.—Amer. Therap., 1893, 64.

Portland Cement.—R. and W. Fresenius (Zeitschr. f. Anal. Chem., xxxii., 433). The chemical characters of a good Portland cement are given as follows:

1. Specific gravity before ignition, at least 3.
2. Specific gravity after ignition, at least 3.12.
3. Loss on ignition, at most 3.4 per cent.
4. Alkalinity of aqueous solution from 0.5 Gm. of cement, not over 7.2 C.c. of tenth normal acid.
5. Potassium permanganate destroyed by 1 Gm. of cement, not over 2.8 Mg.
6. MgO, not over 3 per cent.

Fat Analysis—New Method of.—W. Fahrion has modified Hagura's permanganate process, and operates as follows: 10 Gm. of the fat is saponified with 10 Gm. of sodium hydroxide, dissolved in dilute alcohol. After the alcohol has been expelled, the soap is dissolved in 1 liter of water, and heated to boiling. According to the iodine number of the fat, 10–25 Gm. of potassium permanganate, dissolved in 200–500 C.c. of water, is slowly added, and the boiling is continued for some time. After filtering, the solution is acidified with hydrochloric acid, and when quite cold, the fatty mass is collected on a cloth, well pressed, and then treated with light petroleum. The solid, also unoxidized, portions of the fat pass into solution, whilst the oxidation products are left behind, and may be examined afterwards. In special cases, the process may be still further simplified. To test, for instance, for linoleïc acid in a non-drying oil, 10 Gm. of the sample is, as before, oxidized with 10 Gm., of permanganate. The fatty matter separated by hydrochloric acid is not, however, extracted with light petroleum, but boiled with about 1 liter of water. The liquid is filtered whilst boiling hot, the filtrate is rendered alkaline, concentrated to 100–150 C.c., and while still warm, introduced into a separating funnel. After adding a slight excess of hydrochloric acid and cooling, the liquid is agitated with ether. If the fat contains oleïc acid only, a clear solution is obtained, but should linoleïc acid be present, a white flocculent precipitate of tetrahydroxystearic acid will be noticed. The author has proved the presence of linoleïc acid in lard by this process.—Chem. Zeit., 1893, 610.

Reducing Action of Rancid Fat and Lard on Silver Nitrate.—G. Mariani. Experiments were made with Brulle's nitrate of silver test for margarin. The author finds the reaction useless for the detection of margarin in butter.—Staz. Sper. Agrar., 1893, 350; Jour. Chem. Soc. (Abs.), 1894, 75.

Estimation of Small Quantities of Chlorine in Fats.—R. Benedikt and H. Zikes have devised an apparatus.—Chem. Zeit., 1893, 640 (Illus.).

Fats, Oils, Soaps and Fat Products.—A review of the progress in the industries employing vegetable and animal fats and oils in the manufacture of soaps and other fatty products.—D. Holde, in Chem. Zeit., 1893, 979.

Fats, Oils and Soaps.—Report on the progress during 1893 by G. Bornemann, in Chem. Zeit., 1894, 767.

Estimation of Fat in Flour and Bread.—Polenske recommends the following method (Pharm. Zeit., 1893, 512): A mixture of 10 Gm. of powdered bread, 50 C.c. of water and 1 C.c. hydrochloric acid (sp. gr. 1.124) is digested on boiling water for 1½ hours, then neutralized by the addition of about 1 Gm. of marble dust, 50 C.c. of chloroform added and shaken for 15 minutes. After standing some hours, 25 C.c. of the chloroform is drawn off with a pipette, filtered, evaporated, and the residual fat weighed.

Salicylic Acid in Food—Detection of.—K. P. McElroy reviews the history and tests for salicylic acid. As used in the Department of Agriculture in the examination of canned vegetables, the contents of the can are pulped in a mortar, water added, together with a little phosphoric acid, the mixture strained through a bag, and the liquid subjected to distillation. The distillate is then collected in small portions and each portion separately tested with iron chloride. W. D. Bigelow gives the best strength of ferric chloride to be about five Mgs. to the C.c. The salicylic acid has a tendency to accumulate in the later portions of the distillate, and where the amount present is small, there will be hardly any test given by the first fractions.

For detecting salicylic acid in wine M. Ince employs the following: 210 C.c. of wine are mixed with 10 C.c. of dilute sulphuric acid and the mixture subjected to distillation, the distillate being collected in 50 C.c. portions. The first portion is thrown away and the acid estimated in the next two colorimetrically. The quantity found is multiplied by eight, it being assumed that one-eighth of the total salicylic acid will come over in those two fractions when using the amounts of liquid specified.

The "shaking out" method is also used in the Department to some extent for such goods as beers and wines. The beer or wine is extracted with about half its volume of ether and the extract evaporated to dryness, and the residue taken up with warm water. The resultant solution is tested in the usual way with iron chloride. Between the two processes of separating the salicylic acid, distillation or shaking out with ether, there is not much choice, though the former is cheaper and more expeditious. The increased purity and sharpness of the reaction given by the distillate as compared with that given by the residue from the ether extract, about counterbalance the fact that only a fraction of the salicylic acid appears in the distillate. Objections against the distillation process were raised in 1889 by certain Dutch chemists, on the ground that in the process of fermentation certain "phenol-like bodies" were sometimes formed which interfered with the reaction. "Phenol-like bodies" would interfere not only with the distillation separation but with any other, since phenol is taken up by immiscible solvents from acid solutions precisely as is salicylic acid.

This year three chemists, writing for different German brewing papers, have claimed that in what is called "color" or "caramel" malt a substance exists which gives all the ordinary salicylic acid reactions. The substance is said to exist in many malt extracts rich in isomaltose. J. Brand isolated the substance from color malt and describes all its reactions as being analogous to those of salicylic acid, with the single exception of that with Millon's reagent, with which the new substance gave no reaction. The author procured a set of color and caramel malts from the World's Fair and tried to obtain a salicylic acid reaction from them, but could not do so. Mr. Bigelow tried a large number of them with Millon's reagent, using it side by side with the iron solution. He reported that the Millon's reagent gave salicylic acid in all the samples, irrespective of the reaction upon the ferric chloride. The latter gave salicylic acid in comparatively few. It is only just to say, however, that where ferric chloride indicated the presence of salicylic acid, the reaction given by Millon's reagent was much brighter than where this was not the case.—Amer. Jour. Pharm., 1894, 192; reprinted from Jour. Amer. Chem. Soc., 1894, 198.

A New Method of Detecting Alkaloids, Saccharin and Salicylic Acid.—

Lindemann and Motten, (Bull. Soc. Chim., 1893, No. 9). It is based on the fact that a body in presence of two non-miscible solvents, (separated in layers or by a membrane) passes into both, and in a definite proportion.

To detect strychnine in beer, milk or coffee, 200 C.c. were mixed with a solution of 1 milligramme of strychnine sulphate in 5 C.c. of water, then rendered distinctly alkaline with soda and stratified over 200 C.c. of chloroform in a crystallizing-dish with a flat bottom of the diameter of 180 M.m. After 24 hours, the chloroform was filtered and distilled; the last few C.c. were evaporated in a glass capsule, the residue being taken up with a few drops of water acidulated with sulphuric acid. Benzene may be employed in preference to chloroform, in proving strychnine in beer. To detect strychnine in meat, the latter was finely chopped and 200 Gm. of it mixed with a solution of 2 milligrammes of strychnine sulphate in 200 C.c. of water; this mixture was rendered alkaline, and placed into a dialyzer, chloroform being used as the outer fluid. After 48 hours the chloroform was distilled, and the residue gave the strychnine reaction.

To prove morphine in beer and wine, 200 C.c., containing 10 milligrammes of the alkaloid, were rendered alkaline with ammonia, and stratified over chloroform. The residue of the evaporation of the latter yielded, after purification, a distinct morphine reaction. Amylic alcohol furnished still better results. To avoid the distillation of the latter, it is shaken with water acidulated with sulphuric acid; and the acid liquid separated from the amylic alcohol is rendered alkaline, and shaken out with chloroform, which, on evaporation, leaves the morphine behind.

To detect quinine in beer, the latter was rendered alkaline, and placed in contact with chloroform for 20 hours. The residue of the evaporated chloroform yielded, when taken up with a few C.c. of very dilute sulphuric acid, the fluorescence of quinine sulphate. Even a few milligrammes of the latter may thus be detected with ease. To prove saccharin in beer, 500 C.c. were mixed with 5 milligrammes of saccharin, strongly acidulated with sulphuric acid, and stratified over ether. The layers should not be higher than 5–10 Mm. The contact with ether is maintained for 24 hours, when the ether is distilled off. The residue is characterized by its sweet taste and its transmutation into salicylic acid. Bitter and resinous matter frequently disguise the sweet taste; in this case, the dry residue should be left in contact with a few C.c. of cold concentrated sulphuric acid for 5 minutes, and then diluted with water and filtered—the filtrate being exhausted with ether. The residue after evaporation has, after neutralization, a sweet taste.

The detection of salicylic acid in wine and beer is accomplished like that of saccharin; benzene may be used instead of ether. The residue of distillation is taken up with a few C.c. of water and filtered; the filtrate is again shaken out with benzene; and the latter, separated from the aqueous fluid, is filtered and shaken with 1–2 C.c. of water containing a few drops of ferric-chloride solution, when the aqueous layer will turn violet.

Saccharin and Salicylic Acid.—Hairs employs the following: The liquid is evaporated after being rendered alkaline, as usual, with sodium carbonate and washed sand added as it gets syrupy. The residue is exhausted with alcohol and the liquid distilled. The residue is taken up with water and this solution, acidulated with sulphuric acid, is extracted with ether, which is separated and distilled, with the addition of a few drops of solution of sodium bicarbonate. The residue is dissolved in hydrochloric acid, and a slight excess of bromine water is added. The mixture is strongly agitated in order to agglomerate the precipitate of bromosalicylic acid, and after a short time filtered. The filtrate is freed from excess of bromine by passing a current of air through it, and then agitated with ether. The ether is separated and evaporated with a few drops of sodium bicarbonate solution and the characteristic sweet residue is left. By fusion with potash, the saccharin is converted into salicylic acid and tested in the usual way. A mixture of five milligrammes of saccharin and 7.5 milligrammes of salicylic acid is easily detected, and no fear need be entertained as to the possibility of any salicylic acid escaping precipitation, and so giving the reaction accredited to the saccharin in the filtrate; for experiments showed that ferric chloride did not give the faintest reaction with the filtrate after precipitation with bromine.—Jour. Pharm. d' Anvers., 1893.

Poisonous and Infected Foods.—A. P. Luff considers in this paper that articles of food may become more or less poisonous from the following causes:

1. The poisonous results may be due to food conveying a true infection, or to poisons developed in and from the food by bacterial agencies.
2. The poisonous results may be due to toxic metallic salts.
3. The poisonous results may be due to the presence in the food of the germs or spores of certain specific diseases.
4. The food may be infected with certain parasites or their ova, which parasites or ova are capable of undergoing development in man.

He concludes in a few words as to the preventive measures that may be employed to avert the disasters attendant upon the consumption of such food. The best preventive measure, undoubtedly, is good cooking; that is, sufficiently long exposure of the article of food to a sufficiently high temperature. The smoking of meat is not so effective as cooking. The salting of meat, generally speaking, is more effective than smoking. The importance of boiling, previous to their consumption, water and milk liable to be contaminated with the germs of specific diseases is a matter of common knowledge.—Pharm. Jour. Trans., 1894, 739.

Chemical Analysis of Flour.—Ballard describes the method employed in the central laboratory of the administration.—Jour. Pharm. Chim., 1893, 159.

Estimation of Fibre in Foods by Means of the Centrifugal Apparatus.—W. Thörner. About 1 Gm. of the sample is freed from fatty matter by means of ether. The operation is conducted in a special tube, which is rotated for a few minutes in the author's centrifugal machine. The ether can then be poured off without any loss of insoluble matter. After the layer of ether has been removed the tube is filled with dilute sulphuric acid and placed in boiling water for 30 minutes to cause the starchy matter to dissolve. The insoluble matter takes a long time to settle, but when the tube is placed in the machine and rotated for four minutes at a speed of 2,000 revolutions per minute, the residue completely separates as a compact mass at the bottom of the tube, and the supernatant liquid may then be poured on to a weighed filter. The insoluble matter is then treated with 40 C.c. of hot water for 10 minutes, and the tube is once more whirled. After pouring off the washings the fibre is heated with dilute aqueous potash to remove nitrogenous matters, and again whirled. The fibre is finally transferred to the filter, well washed with water, alcohol and ether, and dried to constant weight. It should, of course, be tested for mineral matter. The process gives very concordant results, and, with a moderate-sized machine, eight estimations may be completed within three or four hours.—Chem. Zeit., 1893, 394.

Detection and Approximate Estimation of Sand in Food Stuffs, Meal, etc.—A. Emmerling. A solution of 1,000 parts of crystallized zinc sulphate in 725 parts of water has, at ordinary temperatures, a sp. gr. of 1.43. A test tube is half filled with this solution and then filled nearly to the top with water, without admixture of the two layers. The substance to be tested is stirred into the water without disturbing the heavy liquid. The organic substances sink only to the surface of the zinc solution, the sand to the bottom of the tube.

For quantitative purposes, a funnel-shaped vessel is used, to the neck of which is attached, by caoutchouc tubing, a graduated tube, each of whose divisions contains 0.2 Gm. of sand. The funnel is 10 Cm. diameter at the top and has an angle of 35°, with a cylindrical neck 17 Cm. long and 3 Cm. diameter, tapered at its lower end at an acute angle to the diameter of the graduated tube. It is filled with the zinc solution to the top of the cylindrical neck, water is added nearly to the edge of the funnel, and 20 Gm. of material is used for each experiment, so that each division of the graduated tube corresponds with 1 per cent. of sand. In the event of the presence of calcium carbonate, the contents of the graduated tube can be treated with acid, washed, incinerated and weighed.—Zeitschr. f. anal. Chem., 1894, 46.

Copper in Foods.—Tschirch (Zeitschr. f. anal. Chem., 1894, 108), uses the following for determining whether the green color in certain preserved foods is due to chlorphyll or to copper phyllocyanate: An alcoholic extract is evaporated to dryness, the residue washed with water, and then treated with concentrated hydrochloric acid. Pure chlorophyll gives a deep blue solution, and a residue soluble in ether with a brown color, but hydrochloric acid dissolves only a small amount of a yellow substance when copper phyllocyanate is present, and the residue dissolves in alcohol with a green color. If dilute hydrochloric acid is added to the alcoholic solution, a green color indicates copper; used in its absence, the mixture is yellow.

Coloring of Peas and Preserved Vegetables with Copper.—The amount of copper that is admissible varies from one part in ten thousand to one in forty thousand. A medium proportion is considered by Tschirch to be unobjectionable, and to allow sufficient latitude to manufacturers. In connection with this point, it is to be remembered that in ordinary diet the daily quantity of copper taken into the system in the form of bread, meat and vegetables, amounts to about one milligramme.—Ibid. (See, also, Bull. Pharm., 1893, 565; Pharm. Jour. Trans., 1894, 605.)

Alewionate for Diabetes.—This is a flower containing 80 to 90 per cent. of vegetable albumen, 7 per cent. carbohydrate, remainder water. For preparation and value see Amer. Drug. and Pharm. Rec., 1893, 50.

Odika Bread.—This bread and fat are derived from Irvingia gabonensis, Baill. It appears that from 48 to 70 per cent. of fat can be obtained from the decorticated seeds, and that this fat consists of laurin and myristin. A similar product, but less rich in fat, is obtained from Irvingia Olivieri, Pierre, in Cochin, China, where it is known as "cay-cay." Another species, I. malayana, Oliver, also passes under the same native name, but it yields much less fat.—Heckel's Annales de l'Institut Botanico-Geologique Colonial de Marseille.

Preservatives in Food—To What Extent is the Use Justifiable.—The Registered Pharm., 1893, 261.

Chemistry of Foods.—Satisfactory references are to be had in addition to those here given, in Chem. Zeit. (Repertorium), 1893 and 1894.

Constitution of Vegetable Proteïds.—E. Fleurent. Gluten, gluten-caseïn, gluten-fibrin, legumin, and vegetable albumen were heated with barium hydroxide solution, as in Schützenberger's experiments with proteïds of animal origin. The products are qualitatively the same, and the non-volatile products likewise amount to about 95 per cent. of the original substance, but the ratio of the ammonia to the barium oxalate and carbonate is very different. In the case of proteïds of the gluten group it is higher, and in the case of legumin and vegetable albumen it is lower, than with proteïds of animal origin. Vegetable caseïn and vegetable fibrin give identical results.—Compt. rend., 1893, 790.

Proteïd Reactions.—J. W. Pickering. Cobalt salts and potash give distinctive color reactions with proteïds, proteoses, and peptones. Native proteïds give a heliotrope purple; proteoses and peptone a red-brown. Certain albuminoids (gelatin, mucin, keratin, elastin, etc.) and various organic substances related to proteïds (biuret, alloxan, uric acid xanthine, hypoxanthine, etc.), give similar colors.

Gelatin gives a play of colors in spectral order; so also do alloxan, biuret, and allantoïn. It is regarded as probable that these reactions, like those similarly produced with copper salts (the so-called biuret reaction) and nickel salts (Gnezda), are due to the presence of the group CONH, and not to cyanogen, as Gnezda considered, the difference between a native proteïd and a peptone being one in the atomic arrangement of the group.

When a cobalt salt has entered into the proteïd molecule, it can be easily displaced by a nickel salt, and that in turn by a copper salt, each in turn yielding its characteristic color reaction. The precipitates of proteïd produced by mercuric chloride, silver nitrate, salicylsulphonic, phosphotungstic, and phosphomolybdic acids, yield typical proteïd color reactions. The nucleo-albumens behave as ordinary proteïds, not as peptones, in their color reactions. The xanthoproteïc reaction and Millon's reaction probably are due to a hydroxybenzene nucleus in the proteïd molecule. The reactions of Liebermann and Adamkiewicz depend on the aromatic portion of the proteïd molecule. Krasser's reaction (a brilliant red, with solution of alloxan) probably depends on an amido-group, as stated by Krasser himself. When metamidobenzoic acid is heated with phosphorus pentachloride, it yields a substance which behaves as Grimaux stated, very like a proteïd, coagulating with heat, especially in presence of a calcium salt. The evidence that Grimaux advanced, that this "colloide amidobenzoique" is free from calcium phosphate, is not regarded as satisfactory. It is, however, to be noted that this material gives, with alkaline solutions of copper, nickel, and cobalt, reactions like those of a proteïd.

No evidence was found that Fröhde's reaction (blue precipitate when a solid proteïd is heated with sulphuric and molybdic acids) and Axenfield's reaction (blue appearance when a proteïd is heated with auric chloride and formic acid, gas being given off) are due to any special molecular group. In connection with the last named reaction, it was found that if the heating is continued for five minutes at the boiling point, the auric chloride is reduced, and a mirror of gold lines the test tube.—Jour. Physiol., 1893, 347; Jour. Chem. Soc. (Abs.), 1893, 615.

Non-Organized Active Proteïd Material.—T. Bokorny. Inactive proteïd is the storage proteïd used in the nutrition of growing plants. The term active proteïd is applied to that in the cell protoplasm, and it is termed non-organized, as it occurs there in granules (proteosomes). A large number of plants were investigated by microscopic and microchemical analysis. The proteïd nature of the granules is readily demonstrable by these means. Their behavior towards ammonia and caffeïne distinguishes them from ordinary non-living albumen, which is indifferent to these reagents; they also show the power of reducing silver salts. The substance is considered to play the part of reserve material for the growth of cells and organs.—Pflüger's Archiv., 1893, 127; Jour. Chem. Soc. (Abs.), 1894, 109.

Protein Flour.—According to Spindler (Zeitschr. für Angew. Chem., 1893), it contains in the dry state 48 to 56 per cent. of nitrogenous bodies and 10 to 18 per cent. of fat. It is made by extracting oil cake or meal with alcohol, roasting the residue and removing the greater portion of the shells. It can be cooked alone or used to raise the percentage of proteïn with other flour.

Estimation of Nitrogen and Proteïds in Milk and its Products.—L. Carcano. According to L'Hote, and Oddy and Cohen, Kjeldahl's method is not suitable for certain substances; with some it gives colored solutions after prolonged heating, and low results are obtained owing to incomplete oxidation and to loss of ammonium sulphate during the heating. Menozzi, and also Musso, estimated nitrogen in milk and its products by Dumas', and by Will and Varrentrapp's methods; they both found that the Will and Varrentrapp method gave low results. The author estimated the nitrogen in milk, Emmenthaler cheese, and cheeses prepared from mare's milk and from sheep's milk, etc., employing both Dumas' and Kjeldahl's methods. Proteïds were also determined in milk by Ritthausen's method. The modification of the Kjeldahl process was that recommended by the Directors of the Italian Agricultural Stations, with due regard to precautions mentioned by Zecchini and Vigna, and by Proskauer and Zülzer. In every case except one the Kjeldahl results were somewhat lower than those obtained by Dumas' method, but the difference was generally very slight. For milk analysis the Kjeldahl process is much less troublesome than Dumas' method, and although somewhat slow, several determinations can be carried on at once.—Staz. Sper. Agrar., 1893, 261; Jour. Chem. Soc. (Abs.), 1894, 76.

Milk—Proteïds of.—M. Arthur. The experiments show that, in addition to caseïnogen, milk contains other proteïds. These differ from caseïnogen in being coagulable by heat, and, like Sebelien, the author separates them into lactalbumin and lactoglobulin.—Arch. de Physiol., 1893, 673; Jour. Chem. Soc. (Abs.), 1894, 23.

Caseïns and Fibrins.—M. Arthus. The name caseïn is given to the principal proteïds of milk, and caseum to the curd produced by rennet. Caseogen is a term given to the caseïn when that substance is modified by rennet added to decalcified milk. It coagulates on heating and appears to correspond to the meta-caseîn of Sir W. Roberts. The lacto-albumen of milk does not belong to this group. Fibrin and fibrinogen form a group analogous to the caseïns.—Jour. Pharm. Chim., 1894, 101.

Preservation of Milk for Estimation of Fat.—M. Weibull adds from 60 to 100 Mg. of potassium permanganate to about 20 C.c. of milk, which will then keep for several months at 64 to 72° F. Sufficient permanganate is added to produce a dark brown color, the milk being shaken until it is completely dissolved; the color disappears in a few days when more permanganate is added. Comparative analysis with fresh milk and with milk kept 6 to 56 days, gave results in which the greatest difference was 0.1 per cent., whilst in 8 out of 11 cases the difference was 0.05 per cent. or less.—Exper. Stat. Rec., 1894, 536.

Preserving Milk.—Villous process: As soon as it is taken from the cows it is cooled down to 15° or 16° C. in the metal containers in which it is to be shipped. Oxygen alone or oxygen mixed with carbonic acid gas, is then driven into the vessel under pressure of two atmospheres. When the requisite quantity of gas has been admitted the turn of a screw hermetically closes the vessel, and the milk is ready for transportation. It will, when thus prepared, keep for many days without souring, or altering in any manner.

Glacialin (Milk Preserving Powder).—

Boric acid, powdered	40 Gm.
Sodium bi-carbonate	60 Gm.

Add one Gm., as much as would be held on the point of a small table knife, to one quart of milk, then boil the milk for at least a quarter of an hour.—Dieterich's Pharm. Manual, 1893.

Comparison of the Various Methods in Use for the Estimation of Milk Fat.—Graffenberger. The various methods in use have been carefully examined, and the author points out the defects of each; he seems to consider Soxhlet's the most exact, as he has used that as the criterion for all the others—all give too low results. Apart from Soxhlet's, Schmidt's and Gottlieb's are the best, while Gerber's method is the worst. Schmidt's and Gottlieb's tally well with one another, but Schmidt's is the most rapid to work. Gerber's and Demichel's can only be considered to be preliminary methods; consequently, the author recommends the methods of Schmidt and Gottlieb as being, taking everything into consideration, exact, the most rapid, and the cheapest.—Landw. Versuchs. Stat., 1893, 247; Jour. Chem. Soc. (Abs.), 1894, 166.

Fatty Matter of Milk—New Method for Determining.—Liebermann and Szekely. Fifty C.c. milk at the temperature of the room are put in a glass cylinder about 25 Cm. in height and about 4½ Cm. internal diameter; there are added 5 C.c. of potassa-lye at 1.27 specific gravity, closed with a well-fitting cork, and well shaken. To this mixture are added 50 C.c. of a light petroleum ether, sp. gr. 0.663, B. P. 60° C., and which evaporates on the water-bath without residue. The glass is stoppered and again vigorously shaken so as to form an emulsion. To this emulsion are added 50 C.c. alcohol of about 95.8 to 96 per cent., and the liquid is again well shaken. After at most four or five minutes the petroleum ether separates at the top, and the separation may be regarded as complete. Shake again three or four times, each time for a quarter of a minute, allowing each time the ether to separate out.

Of the stratum of petroleum ether, 20 C.c. are drawn off with a pipette, and introduced into a small tared capsule, the capacity of which is about 40 to 50 C.c., and the neck of which is higher than 1 Cm., with a diameter of 1½ to 2 Cm. These small flasks are convenient, because the liquid does not readily rise out of them, and yet the evaporation goes on with sufficient rapidity. But of course small tared beakers or ordinary flasks may be used. The flask is set upon a water-bath at a moderate heat, the petroleum ether is evaporated entirely away, and the residue is dried at from 110° to 120° C., for which an hour is generally sufficient; the weight found, if multiplied by 5, gives the quantity of fat in 100 C.c.

The results of the new method vary from those of the gravimetric method by 0.066 in a positive direction, and by 0.037 per cent. in a negative direction.—Zeitschr. f. Anal. Chem., xxxv., 168; Chem. News, 1893, 281.

Fat in Milk—Estimation of.—Weiss's process, extraction of the fat by means of light petroleum, having been adversely criticised by Strassmann, attention is again called to the following important points: 1. The light petroleum containing the fat should be poured off after three hours when testing milk poor in cream; when the sample is very creamy, 12 hours should elapse. 2. A quarter of an hour before pouring off, the mixture should be once more thoroughly shaken. 3. The residual fat must be dried to constant weight, and as it obstinately retains petroleum, the temperature should be raised to 110° C. 4. When reading off the volume of the petroleum layer, the temperature should be noted, and an aliquot part should be pipetted off at the same temperature. To prevent errors arising from expansion or contraction, the author recommends weighing instead of measuring the light petroleum.—Chem. Centralb., 1893, 159; from Pharm. Zeit., 1893, 258.

Milk—Decalcified.—A. E. Wright suggests that since infantile dyspepsia is probably due to the formation of rennet curds, it might be well to delay the rennet coagulation by previously precipitating the lime salts of milk. He finds that an addition of one part of this salt to 200 parts of milk suffices to prevent any rennet coagulation and can hardly be detected by the palate.—Lancet, 3647, 194; Pharm. Jour. Trans., 1893, 85.

Abnormal Milk.—W. W. Cooke and J. L. Hills.—The milk was from a Jersey cow, and the last milking before she went dry. The following results were obtained:

Total solids.	Fat.	Solids not fat.	Caseïn and albumen.	Ash.	Milk sugar.
28.43	14.67	13.76	9.98	1.44	2.33

The milk is remarkable for the small amount of milk sugar, the large amounts of proteïds and ash, and the very large amount of fat. There seems to be no other record of a milk analysis showing more fat than the solids not fat.—Exper. Stat. Record, iv., 487; from Vermont Stat. Rep., 1891.

Identification and Estimation of the Lactoses in Different Milks.—G. Denigès.—In the estimation of lactose in milk, it is best to make use of the reducing power, rather than the optical activity. In 100 C.c. flask are placed 10 C.c. of the milk, 2.5 C.c. of a 5 per cent. solution of sodium metaphosphate, and 60–70 C.c. of water; the mixture is shaken, 0.5 C.c. of hydrochloric acid is added, and the whole is made up to 100 C.c., shaken and filtered. The reducing power of the whey thus obtained is determined by means of Fehling's solution, previously standardized against a solution of pure lactose of known strength.—Jour. Pharm. Chim., 1893, 413.

Dirt in Market Milk—Determination of Proportion of.—L. Schulz puts 1 litre milk from each dealer into a flask closed with a plug of wadding. On its arrival in the laboratory it is transferred to a measuring glass, covered with a piece of filter-paper and a glass plate, and allowed to stand for two hours. The milk is then carefully decanted off from the sediment down to about 30 C.c. the residue is made up to 1 litre with pure water, and again allowed to subside for one hour. It is then again drawn off, repeating this proceeding until all the dirt is left in pure water, which is then decanted off to about 100 or 150 C.c. The dirt is then collected in a tared filter, dried, and weighed. The dirt in the milk may be calculated at five times the dry residue. One litre of market milk was found to contain 3 Mgm. dirt at Würzburg, 3.8 at Leipzig, 9 at Munich, 10.3 at Berlin and 14.92 at Halle. The richness of the milk in microphytes was surprising.—Archiv. fur Hygiene, xiv., 260.

The Phosphates of Milk.—Duclaux. Phosphates exist in milk in a soluble form, tricalcium phosphate and sodium phosphate, and in an insoluble form, phosphates of iron, aluminum, magnesium, and calcium. The insoluble portion contains about twice as much lime and calcium phosphate as the soluble portion. "Phosphate Milk," a milk in which the phosphates are supposed to have been increased by feeding calcium phosphate, contains no more phosphates than other milk. Analyses of milk from various sources showing the total lime as calcium phosphate, the excess of phosphoric acid, mostly combined with aluminum, iron, magnesium, and sodium, and the other mineral constituents, are given. The different results agree closely, so that any addition of either soluble or insoluble phosphates could be detected from the change in the relation of soluble to suspended phosphates.—Exper. Stat. Record, 1893, 978; from Ann. Inst. Pasteur, 1893, 2; Jour. Chem. Soc. (Abs.), 1893, 582.

Solids and Fat in Milk—Estimation of.—J. B. Kinnear. The following process may be used either for cream or for rich or skimmed milk. About 1 Gm. of milk is poured on to a thin, flat tared glass plate, about 2½ inches in diameter, and after weighing is dried in a hot-air chamber, being loosened from the glass by a steel scraper before it is quite dry. The dry solids are weighed and transferred to a ½ oz. tared stoppered bottle, 3 to 4 C.c. of ether added, immersed in warm water for a few minutes, shaken for one minute, then cooled and weighed. As much of the clear solution as possible is now poured into a tared watch glass, the stopper immediately replaced and the bottle again weighed. The fat on the watch-glass is also weighed, and from the data obtained, the fat remaining in the bottle, the total fat in the ether and in the milk, are calculated. The error arising from the evaporation of the ether during the pouring out into the watch-glass, is in author's opinion a negligible quantity for practical purposes, and almost disappears if light petroleum is used as the solvent.—Chem. News, 1893, 1.

Casein and its Organic Phosphorus.—A. Béchamp gives instructions for the detection and determination of phosphorus in casein. He shows that casein is the first instance of a definite chemical species containing six elements—C_m, H_n, N_p, P_q, S_r, O_t.—Compt. rend., cxvii., No. 26.

Analysis of Milk.—Meillère publishes methods for obtaining uniform results on density, dry extract, sugar, fat, organic nitrogen, salts and phosphoric acid.—Jour. Pharm. Chim., 1894, 153.

Specific Gravity of Milk.—M. Weibull considers the differences between the sp. gr. of curdled and fresh milk, and finds it to be about 0.0003 when to the curdled milk about $\frac{1}{10}$ volume of ammonia solution is added.—Chem. Zeit., 1893, 1670.

Determining Value of Milk.—H. G. Piffard describes Babcock's method, which consists, first, in dissociating the oil globules or butter fat from the casein by means of sulphuric acid and heat; second, in collecting the butter fat in one mass by means of centrifugal action; and third, in measuring the volume of the liquid fat in a suitable graduated tube. For the convenient carrying out of this process, Babcock has devised a simple and inexpensive apparatus, consisting of a pipette, a graduated cylindrical glass, and a centrifugal holding a number of test-bottles. Some sulphuric acid and a little hot water include the accessories. With these appliances an exceedingly accurate determination of the butter fat contained in a sample of milk can be made in about ten minutes. For description, see Drug. Circ., 1894, 77.

Humanized Milk.—Method by S. Smith (Pharm. Jour. Trans., 1893, 346). According to this, 6½ ozs. of new milk should be placed in a tall and narrow vessel of about 7 ozs. capacity and allowed to stand for twelve hours, after which the cream is removed. The skimmed milk is then heated to 70°–80° F., and 40 minims of essence of rennet added whilst stirring. After allowing to stand at rest for five minutes, the curd is broken up, and the temperature gradually raised to 150° F., the curd being repeatedly broken up and worked into a mass with a spoon. The whey is next poured off, boiled to destroy the ferment and coagulate the albumen, and filtered while hot through fine flannel previously thoroughly wetted. Bicarbonate of soda, 5 grains, and sugar of milk, 110 grains, are then added to the hot filtrate, after which both the whey and previously removed cream are mixed with 13½ ozs. of new milk, and the mixture is brought to the boiling point. Milk so prepared is said to keep good for forty-eight hours. The skin that forms should be carefully removed immediately before use and the cream that has risen stirred in. Another correspondent in the same number recommends the following formula: "Cream (20 per cent. fat), 1½ oz.; milk (cow's), 1 oz.; water, 5 ozs.; sugar of milk, 3½ drachms. Steam or boil for fifteen or twenty minutes; when cool add lime water, ½ oz."

Milk and Its Products.—A review of the recent work in the examination of milk and its products.—F. J. Herz, in Chem. Zeit., 1893, 1547.

Curdling of Milk.—M. W. Iles suggests the use of hydrogen peroxide instead of rennet.—School of Mines Quart., 1894, 105.

Milk Saturated with Carbonic Acid.—When under pressure will undergo no change within a week according to C. Nowrry and C. Michel.—Chem. and Drug., 1893, 563.

New Element in Human Milk.—Modigliaus (Lo Sperimentale) describes a new corpuscular element in human milk, not visible in fresh milk, but only after a suitable staining process (not given). The corpuscle appears in two forms—one circular, with granular protoplasm and one or more faint nuclei; the other semilunar, embracing in its concavity a fat globule. These corpuscles are present in all specimens of human milk, more numerous in a good nurse, diminish during menstruation, and are probably derivative of leucocytes.—Drug. Circ., Feb., 1894.

Pigments when Ground in Oil.—J. B. Hannay in Chem. News, 1893, 268. The emulsifying or structural property of the oil is entirely destroyed by the addition of a large volume of methylated ether, and instead of having an emulsified liquid difficult to filter, the pigment separates at once from the liquid, and settles to the bottom in flakes like a miniature snow storm. The only points to be observed are, that the methylated ether must be fresh and contain its quota of methyl ethyl ether (as re-distilled ether tends to form the emulsion), and it must be added in very large excess—something approaching 100 C.c. to every Gm. of the pigment. On shaking this up with the pigment, very rapid solution of the oil takes place, and the pigment settles at once free from any oil. The perfectly limpid solution of the oil is decanted, and successive small quantities of ether added to wash the precipitate free from the last traces of oil. This washing may, in the case of white lead, be entirely conducted by decantation, as the lead pigment, owing to its great density, is more easily separated from the oil than any other pigment

Even light flocculent pigments like oxide of zinc settle in a few seconds when fresh ether is used in such great excess, as it preserves great limpidness and allows of immediate settling. Some raw siennas and umbers are so fine that they take more time to settle, and may even require to be decanted through triple Swedish filter paper; but most pigments are obtained in such a flocculent condition that filtration is rapid and easy.

By using 100 C.c. of ether to every gram of pigment the latter is absolutely freed from oil, and after three or four washings to clear it of mother liquor, it may be transferred to a filter and weighed or dried in the flask after the last decantation. On dissolving the white lead, or oxide of zinc, or other easily dissolved pigment, in cold dilute nitric acid after the above treatment, it will be found that a perfectly clear solution will be obtained, giving no trace of cloudiness, showing that no trace of oil or oleic acid adheres to the solid pigment. On passing sulphuretted hydrogen through the ethereal solution of the oil, no trace of coloration is produced, showing that no oleate of lead or other lead compound has gone into solution with the oil, so that an absolute separation has taken place, as this test will show one part of dissolved lead in a million of pigment. On distilling off the ether and heating to drive out any traces of alcohol, the oil is obtained pure and may be weighed.—Drug. Circ., 1893, 153.

Luminous Paint.—According to Jaksch there are four sulphides which, exposed for a certain time to sunlight, become phosphorescent. These are calcium sulphide, strontium sulphide, barium sulphide, and zinc sulphide. The last has only recently been obtained as a luminous material, by distillation in vacuo. Prepared by precipitation it displays no trace of phosphorescence. All but the first named retain the phosphorescent power but a short time after exposure, so that, for practical purposes, we are confined to the use of commercial calcium sulphide. In its pure state calcium sulphide gives forth only a yellowish light, but after being raised to a red heat, and with the addition of a small quantity of a salt of bismuth, it is transformed into a body giving forth a violet light, which lasts more than forty-eight hours after an exposure of a few seconds to sunlight. To make a luminous paint, dissolve in two liters of warm water 500 Gm. of pure white gelatin, and to the solution add one kilogram of the calcium sulphide, treated as above suggested, and 50 Gm. of glycerin. The liquid should be kept hot during its application, and two coats are sufficient in all cases. The addition, so often recommended, of potassium sulphate is not only useless but positively deleterious, because it produces a yellowish-brown tint and completely absorbs the yellow rays of the phosphorescent light. The above is for use in-doors. If the paint is to be employed where it is exposed to the weather, a small amount of shellac dissolved in borax should be added to the paint, and when the latter is dry it should be varnished with one coat of shellac varnish.—Ibid., 154.

Paint Manufacturing Industry.—A review of the business in this country, its present magnitude and future possibilities.—John Newport, in Oil, Paint and Drug. Rep.,1893; reprinted in Drug. Circ., 1893, 233.

Zinc White Paints and Pigments.—G. H. Hurst.—Ibid., 259.

Curiosities in Paint Manufacturing.—T. B. Rawlins refers to the production at the present time.—Oil Paint and Drug. Rep.; Drug. Circ., 1894, 105; Registered Pharm., 1894, 126.

White Leads of Commerce.—Analyses by L. J. Matos show a surprising number to contain barytes.—Drug. Circ., 1893, 272.

Enamel Paints.—An article on their manufacture and uses.—Drug. Circ., 1894, 55; from Chem. Trade Jour.

PHOTOGRAPHY.

Photography—Progress in.—See Chem. Zeit., (Repertorium), 1893 and 1894.

Progress in Photography in 1891 and 1892.—Eder and E. Valenti.—Jour. Pharm. Chim., 1893, 19; from Dingler's Polytech. Jour. cclxxxv., p. 299; after Monit. scientif., May, 1893.

Photography in the Service of Chemistry and Practical Chemists.—E. Valenta.—Chem. Zeit., 1893, 1264.

Photographic Chemistry—Some Recent Developments in.—C. Jones.—Ibid., 1075.

Photography in the Service of the Arts and Sciences.—A series of articles by A. Tschirch, in Pharm. Post, beginning on page 329.

The Solandi Process of Sun Printing.—B. D. Halsted. The process consists in exposing the subject, necessarily translucent to the sunlight, in a printing frame in common use by photographers with a sheet of sensitized paper back of the subject, in the same manner as a print is taken from a negative of the ordinary sort. The paper that has proved most successful is the "American Anslotype" for the manner of using which full directions accompany the same. The sun print thus obtained after it has been tried becomes the negative from which the positive picture is printed. For process in detail with illustrations of results on leaves see Bull. Torr. Bot. Club, 1893, 485.

Cobalt in Photography.—A. and L. Lusnière.—Drug. Circ., 1893, 202, 108. From Compt. rend., 1893.

"*Reducin,*" *a New Photographic Developer.*—H. W. Vogel (Anthony's

Photogr. Bull., 1893, No. 12), reports as follows: 3 Gm. were dissolved in 500 Gm. of water. The solution assumed a peculiar green color and the reducin dissolved rapidly. 9 drops of sulphuric acid and 25 Gm. of sodium sulphite were then added, the solution becoming purely yellow. 2 plates were simultaneously exposed for 10 seconds; the one was developed with sodium and pyrogallic acid, the other with reducin, 4 drops of solution of potassium bromide (1 : 10) being added to each developer. The picture appeared with lightning-like rapidity with the new developer, while it took about 30 seconds with the pyro developer, reducin thus proving to be a considerably quicker developer than pyrogallic acid. Vogel exposed two other plates, one 5 and the other 10 seconds, developed the latter with pyro and 4 drops of a solution of potassium bromide (1 : 10) to 45 of developer, the other with reducin "B" solution and 6 drops of potassium bromide solution. The picture came up again very quickly in the reducin solution, in spite of the short exposure and the increased quantity of potassium bromide; while the picture of double the exposure required with pyro about 6 times as long to appear. The author advises to use reducin in smaller quantity, viz.: 1–25 Gm., besides 25 Gm. of sodium sulphite and 9 drops of sulphuric acid in about 500 C.c. of water.

Thiosinamine as a Fixing Agent.—See organic chemistry.

RUBBER GOODS.

Rubber of the Orinoco.—A. Ernst describes Hevea brasiliensis and the method by which the rubber is collected.—Bull. Misc. Infor. Trinidad, Royal Bot. Gard., June, 1893.

Analysis of Rubber Goods.—D. Holde, continuing his investigations on the methods for the proximate analysis of rubber goods (The Analyst, xviii., 147), has endeavored to ascertain whether the fact mentioned by Henriques in the latter's papers on the same subject (The Analyst, xviii., 13), that ordinary organic solvents extract an appreciable amount of matter from pure rubber, invalidates his (the author's) process for the determination of mineral and fatty oil in rubber mixtures. The solvent used by the author is ether-alcohol in the proportion of 4 to 3, and the chief difficulty apprehended was the possible necessity for repeated extraction to remove the whole of the fatty or mineral oil, as by such repetition the amount of extract from the rubber itself would be unduly increased. Experiments were therefore made to determine whether satisfactory extraction of the oil without too great solution of the rubber could be secured. The general procedure consisted in reducing the rubber to as fine a state of division as practicable by filing it with a clean file, and extracting it on an ordinary filter paper with known quantities of the solvent (ether-alcohol), evaporating the solution and weighing the residue. This was done with pure rubber, and with the same rubber which had been allowed to take up known amounts of various oils. The chief results are recorded in the following table:

Kind of Oil and Rubber.	Per cent oil used.	Per cent oil found.
White erasing rubber plus rape oil	22.1	22.1
White erasing rubber plus rape oil	12.9	14.1
White erasing rubber plus rape oil	18.5	29.2
White erasing rubber plus rape oil	26.8	28.4
White erasing rubber plus cotton-seed oil	59.8	59.7
Rubber cork plus rape oil	15.7	12.9
Rubber cork plus rape oil	26.2	24.2
White rubber tube plus rape oil	26.7	23.7
White rubber tube plus cotton-seed oil	39.3	37.7
White rubber tube plus cotton-seed oil	60.2	58.6

The samples of rubber yielded amounts of soluble matter, consisting of the oily constituent of rubber and free sulphur, varying from 3.7 per cent. to 7.1 per cent. The values given above for the quantity of oil found have been corrected by the deduction of 5 per cent. from the percentage actually obtained, that being a fair mean from the results of the experiments on pure rubber. In general, 60 C.c. of the solvent were used, although 30 C.c. were found sufficient in some cases. The chief cause for the discrepancies of the observed and true percentages of oil is the variation of the quantity of soluble matter yielded by the rubber itself. Greater accuracy could be attained, if necessary, by the determination of the free sulphur in the soluble matter, thus eliminating one of the two unknown quantities.—See Chem. Zeit., 1893, 1634.

Caoutchouc and Guttapercha Industries.—Recent progress in these industries, by R. Henriques, in Chem. Zeit., 1893, 1065.

Regeneration of Caoutchouc.—R. Henriques has analyzed three sorts of reclaimed rubber.—Chem. Zeit., 1893, 1266.

Some New Caoutchouc Plants.—G. Holle considers the following: Bumelia tenox, Willd., Sideroxylon mastichodendron, Jacqu. and Palaguinin gutta, H. Baill.—Arch. der Pharm., 1893, 667.

Brazilian Rubber Supply.—Cultivation and exports.—Chem. and Drug., 1893, 749.

Madagascar Rubber.—Prospects, in Regis. Pharm., 1894, 74.

Rubber in Sierra Leone.—G. F. Scott Elliot, in Colonial Report, says the supply existing in the country traversed by him cannot be considered of great importance.—Pharm. Jour. Trans., 1893, 25.

Vulcanized Rubber Made Soluble.—To 400 parts of the mass add 1,000 parts of water and 60 parts (by volume) of an 8 per cent. solution in water of hydrogen peroxide, and heat in a water-bath for four hours, to a temperature of 80° C. If too much of the peroxide be used the mixture becomes permanently fluid, but with 12 volumes of water to 1 volume of the peroxide, the rubber dissolves, becoming solid again on cooling. As a thickener, the factory uses a mass prepared by boiling for one hour 300 parts of decorticated linseed, 100 parts of water, and 250 parts of acetic acid, and 8 to 10 parts of the solution of hydrogen peroxide.—Drug. Circ., 1894, 80.

WATER.

Bacteriological Examination of Water.—L. Grimbert.—Jour. Pharm. Chim., 1893, 393. Method of examination and distinguishing B. typhosus and B. coli communis.

——— G. P. Drossbach in Chem. News, 1893; reprinted in Drug. Circ., April, 1894.

Mineral Waters.—Moissan and Grimbert have made bacteriological examinations of mineral waters. Results and methods, etc.—Jour. Pharm. Chim., 1894, 424.

Microscopical Organisms of the Brooklyn Water Supply.—A report on the organisms found during the six months from Nov., 1892, to May, 1893, with details of the method of examination and a partial bibliography upon the microscopical examination of water supplies.—S. E. Jelliffe, in Brooklyn Med. Jour., 1893, 593.

Sterilizing Water by Boiling.—The Brit. Med. Jour. quotes from the Berliner klin. Wochenschr. a description of the Siemens apparatus for sterilizing water by boiling, which has been recently improved, the inflow of fresh water being now automatically regulated so that the temperature may always be maintained at the boiling point. The water entering the heated vessel passes through a coiled tube which is surrounded by the outflowing stream. Thus the former is appreciably heated before entering the boiler, whilst the sterilized liquid is somewhat cooled. Experiments with dirty water and water highly polluted with cholera and typhoid bacilli yielded results in every way satisfactory, even when the temp. was not raised above 80° C.—Pharm. Jour. Trans., 1893, 249.

——— By Fe_2Cl_6. F. Watts (Chem. News., lxviii., 178), describes a simple method for this purpose. It consists in adding to hard water sufficient neutral ferric chloride solution to produce a perceptible precipitate. In the case of soft water, a small quantity of lime water or dilute sodium carbonate solution is added after the ferric chloride solution, and so causes a precipitate to form. In either case vigorous stirring promotes the granulation and subsidence of the precipitate, and, after this has subsided, the clear water is drawn off for use. With small quantities of water it may be found advantageous to subsequently pass the water through a simple form of filter, such as a felt bag, or clean sand in a shallow box or a flower-pot, but this is unnecessary with large quantities. One to one and a half fluidounce of B. P. Liquor Ferri Perchlor. Fort. is stated to be sufficient to purify one hundred gallons of water. By treating sufficient for a day's supply at night, the pure water will be ready for use in the morning.

Sterilization of Drinking Water by the William Kuhn System.—The author contends that water for a public supply should be absolutely sterilized. This can be effected by heat alone, the water being kept for 20 minutes at a temperature of 110° C. The cost of the operation on the large scale does not exceed 0.035 franc per hectolitre. Such water must not be allowed to remain in reservoirs, etc., for longer than 24 hours.—Chem. News, 1893, 49; from Rev. Univ. des Mines et de la Met., June, 1893.

Sterilizing Water—Simple Method of.—M. Traube states that by mixing water with chloride of lime in the proportion of half a Mgm. to 100 C.c., all micro-organisms present are destroyed within the space of two hours. Water abounding in bacteria, after having been thus treated, will be found perfectly sterile when tested in suitable culture media. The amount of active chlorine present is reduced within two hours by about 9.1 per cent., and the remainder may be neutralized by the addition of sodium sulphite in sufficient amount. The addition of an excess would not be detrimental, as it would soon be converted into sulphate by the oxygen dissolved in the water. After treatment in this way, water has a pure taste and a perfectly neutral reaction. Whether pathogenic bacteria are destroyed by such treatment has not been exactly ascertained.—Pharm. Jour. Trans., 1894, 731; from Zeitschr. Hygiene, etc., xvi., 149.

Germ-Free Drinking Water.—K. Schipiloff adds from 5 to 6 Cgm. or less of potassium permanganate to each litre of water. Where the water is not heavily loaded with germs, 1 to 2 Cgm. will suffice for each liter. The permanganate not only destroys all bacteria, but even imparts an agreeable (?) taste to the water. To make sure of accomplishing the desired object, the permanganate should be added until it imparts a permanent, slight rosy tinge to the water. This color is then discharged by the addition of a very small proportion of sugar or of brandy.—Amer. Drug. and Pharm. Rec., 1894, 181.

——— Brackebush (Rundschau, 1893) employs the following method: The water to be purified is conducted over caustic lime, through a pipe, to kill all micro-organisms. The filtered water is then saturated to excess with carbonic acid in a glazed earthen, cement or enameled-iron vessel. A part of the lime is thus precipitated, together with all the organic substances present, while the remainder again passes into solution. The drinking-water thus obtained corresponds, it is claimed, both chemically and in taste, with the best rock-spring water. Three hundred grams of caustic lime are sufficient for one kiloliter of water.

Potable Waters—Examination of.—E. J. Parry describes the methods for the following: Physical Examinations; Estimation of Organic Constituents; Organic Analysis; Biological Examination.—West. Drug., 1893, 474.

A Contribution to Decisions on Drinking-Waters.—V. Vedrödi on examining waters taken from depths of 40 and 120 metres, and even greater depths in artesian wells bored in compact clays, found ammonia, nitric acid, and occasionally nitrous acid. At Deheczin water from the depth of 832 metres was found to contain, in 100 Gm. earth extracted with 1 litre of water, 75 Mgm. organic matter, a trace of chlorine, traces of ammonia, and a strong trace of nitrous acid. It seemed impossible that these impurities could be derived from sewage or from polluted superficial drainage. He argues that waters should not be condemned on the evidence of organic matter, ammonia, nitrous acid, chlorine, etc., without a previous examination of the locality.—Chem. Zeit., 1894.

Water Analysis.—Use of Na_2O_2. Rideal and Bult (Chem. News, 1893, 190). Used as a substitute for alkaline permanganate the Na_2O_2 in no case oxidized the nitrogenous organic matter to the same extent, though it gave constant results with the same water. The suggestion is made, that by the use of this reagent a differentiation between different classes of nitrogenous organic matter may be effected.

Acids and Bases in Mineral and other Waters.—Bothamley (Jour. Chem. Soc., lxiii., 696) finds that in solutions containing CaO, MgO, CO_2 and SO_3 the combinations taking place are invariably $MgSO_4$ and $CaCO_3$.

Determining Nitrates in Potable Waters by the Use of Sodium Amalgam.—E. W. Martin and W. G. Berry (School of Mines Quart., 1894, 14), draw the following conclusions from experiments:

1. Reduction is best effected by means of sodium amalgam in a Nessler tube, or one having such proportions that the evolved hydrogen passes through a considerable stratum of the water.

2. The water tested should be acidified (concentrated hydrochloric acid was found to be most suitable for this purpose).

3. Not less than two hours' reduction is necessary.

4. After reduction, the solution must be filtered before Nesslerizing.

5. By the amalgam method lower results may possibly be obtained than by the Zn-Cu reduction, and Nesslerizing without distilling, but the results go to show that more accuracy is attained.

The method adopted is as follows:

Rinse a 100 C.c. Nessler tube with water to be tested, and then fill to the 100 C.c. mark with the water to be tested. Drop in 5 to 10 grammes of freshly prepared sodium amalgam, the amount varying with that of the nitrates presumably present. Enough should be added to keep up the action at ordinary temperatures for two hours.

Cover with a watch-glass, and allow the tube to stand in an atmosphere free from ammonia vapors, after adding one or two drops of concentrated

HCl (free from ammonium salt). After two hours, filter through a small filter previously freed from all traces of ammonia, and Nesslerize 50 C.c. of the filtrate. Deduct free ammonia (found by another operation) and calculate results.

Gravimetric Composition of Water.—W. Dittmar and J. B. Henderson have submitted the synthesis of water by the action of hydrogen on copper oxide to two series of rigorous quantitative experiments. Specially devised, accurately adjusted and duly tested apparatus was employed, which could be securely sealed air-tight by stop-cocks and india-rubber caps and stoppers. The mode of procedure is given.—Chem. News, 1893, 139, 151, 164.

Composition of Drainage Waters in Winter from Land Bare or Covered with Vegetation.—The loss of nitric nitrogen from fallow lands is enormous. In land covered with vegetation the loss is reduced by a variety of causes.—Compt. rend., 1893, Dec. 26.

Purifying River Waters.—Curtman (Chem. and Drug., 1893, 310) uses hydrogen peroxide instead of potassium permanganate. Half an ounce of hydrogen peroxide is added to a gallon pitcher full of water at night, and the water next morning is not entirely, but comparatively, clear, having deposited most of its sediment. Besides this, the bacteria which swarmed in the water disappear to a very great extent, and the organic matter is so much oxidized that on the addition of a few drops of centinormal solution of potassium permanganate the color is not discharged quickly, but remains for a considerable length of time.

Estimation of Free and of "Albuminoid" Ammonia in Drinking-Water.—To judge a drinking-water, J. A. Wanklyn (Pharm. Ztschr. f. Russl., 1893, 780) considers it essential to differentiate between ammonia existing in a free state, and that which is liberated from nitrogenous organic substances by oxidation with potassium permanganate. He proceeds as follows: 500 C.c. of water are distilled off in a capacious retort supplied with a ball-shoulder; the first 50 C.c. passing over are collected and "Nesslerized." The next 150 C.c. of distillate are thrown away, and then 50 C.c. of alkaline potassium-permanganate solution (200 Gm. of potassa and 8 Gm. of potassium permanganate pro litre) are added, and distillation continued. The subsequent distillate is gathered in three equal fractions (50 C.c. each), each of which is "Nesslerized" separately. The author's results lead to the following general conclusions: Deep well water, which has experienced a perfect natural purification, is so pure that not even 0.01 Mgm. of albuminoid ammonia can be detected in a litre. Filtered sea- or river-water contains 0.05–0.1 Mgm. per litre; as soon as the proportion exceeds 0.1 Mgm. filtration is to be regarded as insufficient. Bad well-water contains 0.15–0.8 Mgm. of albuminoid ammonia per litre; and canal-water, 0.9 Mgm. and over. As to the free ammonia, when more than 0.8 Mgm. are present in each litre, it probably originates from urine recently percolated through the soil, especially if there be also a considerable amount of chlorides. An abundance of albuminoid ammonia, little free ammonia, and almost no chlorides, point to vegetable pollution; such water is also very deleterious to health.

Detection of Ammonia by the Nessler Reaction.—L. L. de Koninck. An alcoholic solution of ammonia gives no precipitate, nor even a coloration, with the Nessler test. Alcohol does not, however, prevent the reaction of ammonia with mercuric chloride (Bohlig's reaction).—Zeitschr. f. Anal. Chem., 1893, 188.

Hydrotimetry—History of.—L. L. de Koninck points out in the Chem. Zeit., that Clark, in his process for determining the hardness of water, had been anticipated by Occum in his "Practical Treatise on the Use and Application of Chemical Tests, etc." (1818, second edition). Clark's merit. according to de Koninck, consists in his having rendered the process quantitative by an adoption of the volumetric method.—Chem. News., 1894, 300.

Iron in Water.—A. Zega proposes the following method for a colorimetric estimation of iron in water. To 100 C.c. of the water (in which the iron has already been oxidized to the ferric condition) 1 C.c. of nitric acid (sp. gr. 1.35 to 1.40) and 5 C.c. of a 5 per cent. solution potassium thiocyanate, are added. The coloration develops rapidly and does not darken on remaining. 100 C.c. of distilled water is then similarly treated, and a standardized solution of a ferric salt containing 0.01 Mgm. of iron per C.c. run in until the coloration produced is equal to that in the water under examination. The quantity of ferric solution added represents, of course, the quantity of iron in the water. In this way 0.01 Mgm. of iron per 100 C.c. of water is easily estimated.—Chem. Zeit., 1894, 1564.

Colorimetric Determination of Iron in Well Waters.—Gerhard (Archiv. der Pharm., ccxxx., 705), recommends tannic acid for this purpose.

Mineral Waters Containing Iron—The Decomposition of.—Observations on the effect of the "iron" bacillus on absorbing the iron from solution.—Tolomei, in Pharm. Post, 1893, 351.

Detection of Lead Salts in Drinking Water.—One liter of the water and five C.c. of glacial acetic acid are evaporated to 100 C.c., filtered, and 1–2 drops of a diluted hydrogen sulphide solution (1 part saturated solution with 2 parts distilled water), added; the presence of lead salts causes a brown coloration, which is to be compared with the result gained with a water known to be free from lead. It is possible by this procedure to detect 0.05 Mgm. lead in 100 C.c. water. By comparison with very dilute solutions of known strength the lead may be approximately estimated.—M. T. Lecco, Chem. Ztg., 1893, 1431.

Solutions of Metaphenylenediamine for the Detection of Nitrites and Hy-

drogen Peroxide.—G. Deniges (Zeitschr. f. Anal. Chem., 1893, 216), dissolves ·2 Gm. of the hydrochloric substance in 100 C.c. ammonia, and places solution in a bottle fitted with a glass stopper; adds 5 Gm. animal charcoal; shakes repeatedly, allows liquid to subside over night. Liquid is shaken again until perfectly colorless, if not so. It keeps for an indefinite time in contact with animal charcoal, if not more than 2 to 4 parts of metaphenylenediamine, have been used with 100 parts of ammonia. Aqueous and alcoholic solutions cannot be preserved. For detecting nitrous acid 5 drops of the reagent are mixed with 5 C.c. dilute sulphuric acid (1 : 5). To this mixture (colorless) add 1 C.c. of the water under examination; heat for 5 minutes on a water-bath. A yellow coloration indicates nitrous acid.

Nitrates in Potable Waters.—Gill (Jour. Am. Chem. Soc., xvi., 193) gives a series of comparative results made between the aluminum method and the phenol sulphuric method. The latter is shown to be the most delicate, and yields more accurate results; the aluminum process giving, on the whole, lower results than the phenol sulphuric. Other reduction methods are also regarded as less delicate or satisfactory.

Estimation of Organic Matter in Potable Water by means of Permanganate.—P. E. Alessandri proposes to use a standard solution of potassium permanganate containing 0.200 Gm. per litre for the titration; it is made up by dissolving the necessary quantity of permanganate in a litre of distilled water. 100 C.c. of the water is boiled for 5 minutes with 10 C.c. of dilute sulphuric acid, and the standard permanganate is added until the color is no longer discharged. It is then boiled again for 6–7 minutes, and if the color disappears, more permanganate is added as before. The number of C.c. of this solution decolorized by a litre of the water gives directly the number of centigms. of organic matter per litre. A standard solution, prepared by dissolving 0.400 Gm. of pure crystallized oxalic acid in a litre of water, may be conveniently employed to determine the excess of permanganate added to the water.—L'Orosi, xvi., 397; Jour. Chem. Soc. (Abs.), 1894, 256.

Estimation of Dissolved Oxygen in Water.—C. M. van Deventer and B. H. Jürgens.—The method described depends on the fact that when iodine is set free from potassium iodide by means of free nitrous acid, nitric oxide is formed, but that if dissolved oxygen is present, the latter combines with the nitric oxide, forming NO_2 or N_2O_3, which in presence of acid liberates a fresh quantity of iodine.—Chem. Centralb., 1893, 546; from Maandbl. naturw., 1893, 72.

"*Gyrenbader*" *Mineral Water.*—Chemical examination by E. P. Treadwell.—Arch. de Pharm., 1893, 579.

Analysis of Some Mineral Waters.—W. Thörner, in Chem. Zeit., 1893, 1361, 1411.

Mineral Waters Free from Air.—H. Huebner (Apoth. Zeit., 1893, 299) has a process, the main feature of which consists in boiling a mineral water until presumably all the air has been driven out, and then emptying the hot water directly into a fountain filled with carbon dioxide, the air being excluded. On cooling, the fountain is charged.

Micro-organisms in Mineral Waters.—West. Drug., 1893, 103, 327.

GENERAL.

Recent Progress in Chemical Technology.—Lecture by S. P. Sadtler.—Jour. Frank. Ins., Jan., 1894; reprinted in Pharm. Era, 1894, 204.

Industrial Chemists—The Education of.—Address by George Lunge, in Jour. Am. Chem. Soc., 1893; reprinted in Pharm. Jour. Trans., 1894, 556.

Chemistry of Agriculture.—T. Tickle, in Pharm. Jour. Trans., 1894, 879. Paper deals with what constitutes a soil, what impoverishes it and what enriches it.

Annual Meeting of the Swiss Analytical Chemists.—In St. Gall, Sept. 28–30. An account of the proceedings.—Chem. Zeit., 1893, 1543.

Kieselguhr.—E. J. Parry (Chem. and Drug., 1894, 570) gives analyses of so-called "fossil meals":

—	No. 1.	No. 2.	No. 3.
Moisture	5.03	7.68	5.82
Loss on ignition (almost entirely organic)	3.41	3.11	12.59
Silica (insoluble)	86.10	85.00	73.25
" (soluble)	2.44	2.50	2.60
Fe_2O_3 and Al_2O_3	2.40	1.50	5.65
Alkalies	0.40	—	—

The Coal-Tar Colors in their Sanitary Relations.—H. Leffmann states that dangerous effects of the artificial colors may arise: 1. Actual toxic action of the color. 2. Presence of poisonous impurities, either (*a*) from use of such substances during manufacture, or (*b*) from liability to adulteration. 3. Employment of the color to conceal substitution or adulteration of food products.—Pharm. Era, 1894, 393.

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Bentley, Robert, born in 1821; died in London, Dec. 24, 1893.

Brown-Séquard, born on April 8, 1817; died, April 2, 1894.

Carteigie, John, born, 1824; died, April, 1894.

Castleton, Edward Ligon Enders, born in 1860; died at Houston, Texas, Sept. 17, 1893.

Crenshaw, Edmund A., born, 1827; died, Philadelphia, Feb. 19, 1894.

Cutler, Wm. J., born, 1815; died, Boston, April 1, 1894.

Delffs, Wm., born, April 21, 1812; died, March 23, 1894, in Heidelberg.

Dyche, D. R., born, March 11, 1827; died, Evanston, Ill., Aug. 4, 1893.

De Marignac, Jean Charles Galssard, born in 1818; died, Geneva, April 15, 1894.

Dieterich, Wm. Julius, born, June 3, 1828; died in Gottingen, April 13, 1894.

Francis, George Baggett, born, 1821; died, Dec. 2, 1893.

Frémy, Edmond, born in 1814; died, Feb. 3, 1894.

Harrison, O. G., born in 1867 (?); died in New York City, Jan. 14, 1893.

Hasskarl, Justus Karl, born, Dec. 6, 1811; died at Cleve, Germany, Jan. 5, 1894.

Heaton, C. W., Professor of Chemistry in Charing Cross Hospital.

Hertz, Heinrich R., born, Feb. 22, 1857; died, Jan. 1, 1894.

Hobart, G. S., born, 1834; died, Kingston, Can., Feb., 1894.

Hommel, Philemon E., born in 1836; died in Jersey City, Sept. 14, 1893.

Kemp, George, born in 1825; died, New York City, Nov. 23, 1893.

Koellner, Joseph I., born, June 30, 1830; died, New York, May 5, 1894.

Lescher, Joseph Sidney, born in 1803; died, Hampstead, July 5, 1893.

Martin, Hugo Wm. Conrad, born at Fond du Lac, Wis., March 8, 1853; died, April 29, 1894.

May, John, born in 1808; died, Battersea, Eng., Nov. 7, 1893.

McKesson, John, born, Feb. 22, 1807; died in New York City, Oct. 11, 1893.

Metcalf, Theodore, born, Jan. 21, 1812; died, Boston, April 26, 1894.

Moffitt, John S., born, July 7, 1854; died, St. Louis, May 18, 1894.

Pattison, George, born in 1824; died, Islington. N., Eng., June 7, 1894.

Savage, Wm. Dawson, born in 1809; died, Brighton, Eng., June 19, 1894.

Schively, William Henry, born in 1821; died, Philadelphia, Jan., 1894.

Schmidt, Carl, born, June 1, 1822; died in Dorpat, Feb. 27, 1894.

Sher, Frank P., born in 1855; died in Philadelphia, Nov. 14, 1893.

Shrubsole, George Wm., born in 1829; died, Chester, Eng., July 21, 1893.

Smith, Thomas, born, Jan. 9, 1807; died, Edinburgh, July 19, 1893.

Spruce, Richard, born in 1817; died at Corneysthorpe, Yorkshire, Dec. 28, 1894.

Talcott, Seth, born, 1830; died, Hartford, Conn., April 16, 1894.

Van Beneden, P. J., born in 1809; died at Louvain, Jan. 8, 1894.

Vennard, Wm. L., born, Sept., 1843; died, Oct. 28, 1893, in New York City.

Von Uslar, Louis, born, 1828; died, May, 1894.

Webb, Wm. B., born in York, Pa., Sept. 6, 1824; died in Philadelphia, Feb. 10, 1894. For memoir, see Amer. Jour. Pharm., 1894, 301.

Wilson, George, born in 1819; died, Victoria, Aus., June 14, 1893.

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The work as above indicated in the title is a polyglot lexicon of pharmaceutical synonyms in Latin, German, French, English, Polish, and Russian. The articles are very voluminously treated with regard to their vernacular names in the spoken languages; not only are crude materials of both the vegetable and mineral materia medica noted in the Lexicon, but also the products yielded by them and the pharmaceutical preparations made from them, such as oils, tinctures, ointments, etc. There is also to be found mention of all the newer synthetic chemicals, such as phenacetin, aristol, etc.

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* For list of Biographical Works, see Proc., Vol. XLI., 1893, 953.

BACTERIOLOGY.

Chemische und bacteriologische Brunnenwasser-Untersuchung im I. Stadttheil (Techelferscher Bezirk) zu Jurjew (Dorpat). E. Seegrön Jurjew (Dorpat): E. J. Karows.

Chemische und bacteriologische Brunnenwasser-Untersuchungen im Hospitalbezirk (II. Stadttheil) zu Jurjew (Dorpat). Dorpat: E. J. Karows.

Bacteriologische Untersuchungen des Grundwassers in Jurjew, nebst Studien über das Verhalten einiger Saprophyten im Wasser. Dorpat: E. J. Karows.

An Introduction to Practical Bacteriology for Physicians, Chemists and Students. Dr. Migula. Trans. by M. Campbell, and edited by H. J. Campbell. London: Swan, Sonnenschein and Co.

Manual of Bacteriology for Practitioners and Students. S. L. Schenk. Translated by W. R. Dawson. London: Longmans, Green and Co.

Manual of Bacteriology for Practitioners and Students, with Especial Reference to Practical Methods. By S. L. Schenck. Translated from the German (by the author's permission), with an Appendix, by W. R. Dawson; with 100 illustrations, partly colored. London: Longmans, Green & Co.

This book is an English edition rather than a mere translation of Schenk's "Grundriss der Bakteriologie," which made its appearance not long since in Germany, both the translator and Schenk himself having contributed additional data.

The Bacterial Poisons. By N. Gamaleia. Translated by E. P. Hurd. Detroit: Geo. S. Davis.

Jahresbericht über die Fortschritte in der Lehre von den pathogenen Mikroorganismen, umfassend Bacterien, Pilze, und Protozöen. Unter Mitwirkung von Fachgenossen bearbeitet und herausgegeben von P. Baumgarten. 7. Jahrg., 1891. Braunschweig: H. Bruhn.

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Mikrophotographischer Atlas der Bakterienkunde. C. Fraenkel u. R. Pfeiffer. 2 Aufl. 9 u. 10 Lief. Berlin: Aug. Hirschwald.

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Bakterienkunde. G. Itzerott. Ein kurzer Leitfaden für Studirende und Aerzte. Leipzig: Ambr. Abel.

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Directions for Laboratory Work in Bacteriology. Fred. G. Novy. 1 vol., pp. 209 Ann Arbor: Geo. Mahr.

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Index to the Literature of Stereochemistry. A. Eilvart. Journ. Am. Chem. Soc., xiv., 241–284. This carefully prepared index also accompanies the author's "Guide to Stereochemistry," issued independently (New York, 1893). The material is arranged alphabetically by authors, with a chronological classification of publications and a special list of reviews.

Index to the Literature of Explosives. Part 2. C. E. Munroe. Baltimore, 1893, 43–195, 8vo. This completes the undertaking begun several years ago by Munroe. Part 1 was issued in 1886; twelve sets of periodicals embracing 984 volumes have been carefully examined.

Materials for a Monograph on Inuline. J. C. Bay. Trans. Acad. Sci., St. Louis, vi., 157 (1893). 9 pp., 8vo.

Bibliography of the Tannoids. J. C. Bay. Fifth Ann. Report Missouri Botanical Garden (May, 1893). 27 pp., 8vo.

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A Bibliography of Analytical and Applied Chemistry for the Year of 1892. H. C. Bolton. J. Anal. Appl. Chem. (1893).

A Select Bibliography of Chemistry: 1492–1892. H. C. Bolton. Smithsonian Miscellaneous Collections, No. 850. Washington City, 1893. Pp. xxi., 1212. 8vo.

The volume serves as a general index to chemical works published in English (British Isles and America), Dutch, Danish, Norwegian, Swedish, Italian, Portuguese, Spanish, Hungarian, Russian, Polish, Bohemian, and other Slavonic languages. There are seven sections into which the work is divided: 1. Bibliography; 2. Dictionaries; 3. History; 4. Biography; 5. Pure and Applied Chemistry; 6. Alchemy; 7. Periodicals. Except in the fourth and last sections, the titles of books referred to are arranged alphabetically according to authors. Biographical works are arranged according to the names of the persons described, with cross references to the authors.

Bibliographie des Sciences Chimiques. Paris: J. B. Bailliere et fils.

Jahrbuch der Naturwissenschaften 1893–1894. M. Wildermann. Enthaltend die hervorragendsten Fortschritte auf den Gebieten; Physik, Chemie und Chemische Technologie; Mechanik; Meteorologie und Physikalische Geographie; Astronomy und Mathematische Geographie; Zoologie und Botanik; Forst und Landwirthschaft; Mineralogie und Geologie; Anthropologie und Urgeschichte; Gesundheitspflege, Medicin und Physiologie; Länder und Volkerkunde; Handel, Industrie und Verkehr. 9 Jahrgang. Freiburg: Herder.

The Year-book of Science for 1892. Edited by Bonney. London: Cassell & Co. (Limited). 8vo. Pp. 520.

To put a complete digest of a year's science in a 500-page volume would be impossible. The editor and contributors of this Year-book endeavor to give "a review" of the year, the branches dealt with being physics (including astronomy and meteorology), chemistry, geology and mineralogy, animal biology, etc.

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Gallerie hervorragender Therapeutiker und Pharmakognosten der Gegenwart. Lief. 7. Ferd. von Müller, Ernst Schmidt, C. A. J. Oudemans, P. Albertoni, P. Spica. Genf: R. Reber.

——— Lief. 8. O. Liebreich, T. R. Fraser, A. Garcke, Franz v. Höhnel, David Hooper.

——— Lief. 9. J. E. de Vrij, R. W. Van Gorksom, Albert Hilger, I. Guareschi, C I. H. Warden.

BOTANY AND MATERIA MEDICA (VEGETABLE).

Die natürlichen Pflanzenfamilien, nebst ihren Gattungen und wichtigeren Arten, insbesondere den Nutzpflanzen, bearbeitet unter Mitwirkung zahlreicher hervorragender Fachgelehrten. A. Engler u. K. Prantl. 86 Lief. 3 Th. I. Abtheil. 100 Lief. Leipzig: W. Englemann.

Les Kolas Africains. E. Heckel. Monographie botanique, chimique, thérapeutique et pharmacologique. Paris: Société d'editions scientifiques.

Official Guide to the Museums of Economic Botany, Royal Gardens, Kew. No. 3, Timbers. Second Ed., revised and augmented. London: Eyre and Spottiswoode.

Trimble, Henry. The Tannins: A Monograph on the History, Preparation, Properties, Methods of Estimation, and Uses of the Vegetable Astringents, with an index to the Literature of the Subject. Vol. II. Philadelphia: J. B. Lippincott and Co.

In his first volume on "The Tannins," Trimble confined himself to a discussion of the tannins as a class and the tannins of nut-galls which may be said to stand by itself. In the present volume the author considers the physiological tannins: *Oak bark*, *Mangrove*, *Canaigre* and *Chestnut*. In the study of this class of plant constituents, the author has considered them from the standpoint of the analytical chemist preparing the way for the physiological botanist.

In looking upon the composition of the tannins discussed in this volume and comparing them with what appear to be trustworthy results obtained in recent years by other investigators, Trimble finds that they arrange themselves into two groups: the *gall-tannin group* (C, 52.17; H, 3.10), and the *oak-tannin group* (C, 60.00; H, 5.00). This is likewise confirmed by the action of certain reagents, as ferric salts, calcium hydrate and bromine water. The decomposition of the above tannins by heat, by acids, and by alkaloids, again further confirms the above grouping.

With the above facts in view, the conclusion naturally forces itself upon us that there are two groups of the tannins; there are, however, the results of many investigators to account for and reconcile. With as many properties in common, the author says, in conclusion, we cannot expect that there exist many groups. We naturally look for only one; the facts, however, demand at least two; a close chemical relation, therefore, probably exists between these two; to discover that relation, and classify the remaining uninvestigated members, still offers a most attractive field to the plant chemist.

Zur Frage über die Wirkung des bromwasserstoffsauren Scopolamins. R. Ernst Jurjew (Dorpat): E. J. Karow.

Zur Pharmakologie der Camphergruppe und der ätherischen Oele. A. Lapin. Dorpat: E. J. Karow.

Ein Beitrag zur Kenntniss der Benzoeharze. J. Salkind. Dorpat: E. J. Karow.

Contribution à l'Étude des Gommes Laques des Indes et de Madagascar. Albert Gascard. Paris: Société d'éditions scientifiques

Contribution to the study of shellac of India and Madagascar. This thesis, from the Paris school, shows the observations of the author on shellac from India. The other, from Madagascar, is a new article. The resin obtained therefrom yields by oxidation with permanganate of potash in alkaline solution, butyric acid and ammonia. In the wax, the author shows the existence of cerylic alcohol, etherized with formic acid or oleic acid, and acids containing nitrogen, which are found partially in the free state. The thesis is illustrated by one plate of the shellac from Madagascar.

Monograph on Belladonna. Articles on the botany, pharmacognosy, pharmacy, therapeutics, etc., of Belladonna, by T. B. Kilmer, Henry Kraemer, Chas. Rice, J. M. Maisch, J. U. Lloyd, J. P. Remington, R. G. Eccles, H. C. Wood, W. C. Caldwell, J. B. Smith, A. R. L. Dohme and R. W. Johnson. New York: Johnson and Johnson.

A New Systematic Botany of North America is announced under the editorship of George F. Atkinson, Nathaniel L. Britton, John M. Coulter, Frederick V. Coville, Edward L. Greene, Byron D. Halsted, Arthur Hollick, and Lucien M. Underwood.

Each monographer will be responsible for his own matter, the only restrictions placed on contributors being that they conform to a general style, to principles of nomenclature and to citations, and that descriptions be extended only to an average limit of a certain number of words, this number to be hereafter determined. The treatment of these matters will be indicated by sample sheets, which will be distributed at an early date. It is expected that an approximately uniform consideration of species can be secured.

The editors believe it will be possible to produce a complete systematic botany of the country within fifteen years. They fully realize the impracticability of such a task being accomplished by a few students only, and earnestly desire the aid and support of all American botanists.

Sohn, Chas. E. Dictionary of the Active Principles of Plants. London: Balliere, Tindall and Cox. Philada.: J. B. Lippincott Co. Alkaloids, Bitter Principles, Glucosides: their Sources, Nature and Chemical Characteristics, with Tabular Summary, Classification of Reactions, and Full Botanical and General Indexes. The first portion of the book gives the plants concerned in alphabetical order, the natural order to which each belongs, the names of the chemists by whom it has been investigated, with references to their original memoirs. Then follow the names and the composition of their active principles, their solubilities and reactions. The second part of the work is the practical summary. For the full details of tests for any one substance, the reader is referred to Part I., and for other substances giving similar reactions to Part III. In parallel columns are to be found the names of the substance, with its formula, appearance or crystalline form, melting point, solubilities, reactions and behavior with special reagents, etc. Then follow the botanical index and the general index, with certain addenda.

Sur les végétaux qui produisent le beurre et le pain d' O'Dika. Par E. Heckel. Published by the author.

Wattle Bark. Report of the Board of Inquiry, Melbourne: Rob't S. Brain.

Tabulated List and Synopsis of Materia Medica. C. Stephan. London: Thos. Christy and Co.

Handbook to the Flora of Ceylon. Henry Trimen. Published under the authority of the Government of Ceylon. Part I. deals with Ranunculaceæ to Anacardiaceæ, accompanied by 25 plates.

Minnesota Botanical Studies. Bulletin No. 9, Part II., from the Geological and Natural History Survey of Minnesota. Conway MacMillan, State Botanist.

Missouri Botanical Garden. Fifth Annual Report. St. Louis, Mo. 1894. Published by the Board of Trustees. Pp. 166, and 32 plates.

The Director of the Garden, William Trelease, may be said to be the author of this interesting and beautiful volume. It is made up of (1) Reports of the Officers and Director; (2) Anniversary Publications; (3) Scientific Papers. The last show considerable care and original research on the part of the authors. Three of the papers are of especial interest and value, viz.: "A Study of the Venation of the Species of Salix described in Gray's Manual, with Reference to their Determination," by Dr. N. M. Glatfelter. "Material for a Monograph on the Tannoids, with Special Reference to Vegetable Physiology," by J. Christian Bay, and "The Sugar Maples, with a Winter Synopsis of all North American Maples," by William Trelease. The Report is published for gratuitous distribution and exchange within certain limits, but may be purchased of the agents, A. E. Foote, of Philadelphia; W. Wesley & Son, of London, and R. Friedländer & Son, of Berlin.

Pharmacographia Indica. A History of the Principal Drugs of Vegetable Origin met with in India. By Wm. Dymock, C. J. H. Warden, and David Hooper. London: Kegan, Paul, French, Trubner & Co., L't'd. 1893. Part VI., pp. 313–642.

Étude Monographique de la Famille des Globulariées, au point de vue Botanique, Chimique, et Therapeutique. Par Edouard Heckel, avec la Collaboration de Schlagdenhauffen pour la Partie Chimique, et de J. Moursou pour la Partie Therapeutique. Paris: G. Masson.

A Class Compend of Pharmaceutic Botany, embracing an elementary treatise on the structural, morphologic, microscopic, physiologic and systematic department of botany, designed especially for students of pharmacy and pharmacists. By David M. R. Culbreth. With a synopsis of the natural orders that includes the vegetable drugs of the U. S. Pharmacopœia, 1890. Illustrated. Baltimore: Published by the author.

Das kleine botanische Prakticum. E. Strasburger. English translation. London: Swann, Sonnenschein.

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Kurzes Repetitorium der officinellen Pflanzen und Pflanzen-familien zur Vorbereitung zum Gehülfenexamen und für Studirende der Pharmacie und Medicin. P. Bardeleben. Konigsberg: Gräfe u. Unzer.

Das Harz der Nadelhölzer, seine Entstehung, Vertheilung, Bedeutung, und Gewinnung. Für Forstmänner, Botaniker, und Techniker bearbeitet. H. Mayr. Berlin: Julius Springer.

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Flora brasiliensis. Enumeratio plantarum in Brasilia hactenus detectarum quas suis aliorum que botanicorum studiis descriptas et methodo naturali digestas, partim icone illustratas, edd. C. F. Martius, A. W. Eichlerst, I. Urban. Leipzig: Fried. Fleischer.

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Historia das plantas medicinaes e uteis do Brazil, contendo a descripcão botanica, cultura, partes usadas, composicão chimica, seu emprego em diversas molestias, doses, usos industriaes, etc. 5 Fasciculo. T. Peckolt e G. Peckolt. Rio de Janeiro. Companhia Typographia do Brazil. A work upon the medicinal and useful plants of Brazil. Containing an account of their cultivation, value, constituents, medicinal use, etc.

Flora von Deutschland, Deutsch-Oesterreich und der Schweiz. H. Karsten. Mit Einschluss der fremdländischen medicinisch und technisch wichtigen Pflanzendrogen und deren chemisch-physiologischen Eigenschaften. 2 u. 3. Aufl. 2. Lief. F. E. Köhlers Verlagsbuchh., Gera-Unterrnhaus.

Wandtafeln für den Unterricht in der Pflanzenphysiologie. B. Frank u. A. Tschirch. 6 Abth. Berlin: Paul Parey.

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The Student's Introductory Handbook of Systematic Botany. By J. W. Oliver.

The author points out in the preface that this work is intended chiefly for students who have already passed through an elementary course, and for this reason he begins with the Cryptogams, and passes on through the Gymnosperms to the Angiosperms, so as to allow of a more distinctly biological treatment of the subject than would be possible by the reverse process. The author follows the modern method of classification, dividing the vegetable kingdom into Thallophytes, Bryophytes, Pteridophytes, Gymnospermæ, and Angiospermæ. Nearly half of the book is devoted to the first three sections, because the author's experience as a teacher has shown him that it is mainly in the lower forms of life that the student most needs help. Also for the reason that in all the higher botanical and biological examinations a considerable knowledge of the Cryptogams is required, a somewhat full and detailed description of those typical genera which are used in these examinations is given. Examinations inevitably direct the line of education, and although opinions may differ as to the relative value of a knowledge of the Cryptogams generally as compared with the Phanerogams, there can be no doubt of the importance of an acquaintance with the life history of the Schizomycetes and parasitic fungi.

Second Systematic Census of Australian Plants, with Chronologic, Literary, and Geographic Annotations. Part I. Vasculares. By Baron F. von Mueller.

Select Extra-Tropical Plants Readily Eligible for Industrial Cultivation or Naturalization, with Indications of their Native Countries and Some of their Uses. By Baron Ferd. von Mueller. Eighth Edition; revised and enlarged. Melbourne: Chas. Troedel & Co.

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Mittheilungen aus dem botan. Laboratorium mit Samen-Prüfungsanstalt von O. B. in Hamburg. O. Burchard. No. III. Hamburg: W. Mauke Söhne.

Die tropische Agricultur. H. Semmler. Ein Handbuch für Pflanzer und Kaufleute. 4 Band. 2 Hälfte (Schluss). Wismar: Hinstorff.

Die wichtigsten Rohstoffe des Pflanzenreiches. C. A. Müller. Kurzes Lehrbuch der Waarenkunde für Fachschulen und zum Selbstunterricht. Leipzig: F. Hirt u. Sohn.

Deutsche Schulflora zum Gebrauch für die Schule und zum Selbstunterricht. W. Müller u. F. O. Pilling. (In 60 Lieferungen.) Gera: Theodor Hofmann.

Bibliotheca botanica. Abhandlungen aus dem Gesammtgebiete der Botanik. Herausgegeben von Ch. Luerssen und F. H. Haenlein. 28 Heft. I. Lief. Stuttgart: Erwin Nägele.

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The author discusses the subjects in the following order:

Chapter I.—Introduction and definition.

II.—Specific gravity. Methods of determining the specific gravity of solids, liquids and gases, with calculated examples under each head.

III.—Chemical nomenclature and notation, giving the various earlier systems, and concluding with a summary of the rules for the spelling and pronunciation of chemical terms as adopted by the American Association for the Advancement of Science in 1891.

IV.—Atoms, atomic mass and valence, the various methods of determination are presented by calculated problems affording good illustrations of the different methods.

V.—Chemical formulæ.

VI.—Structure of molecules, discusses molecular volume, refraction, and the magnetic rotation of the plane of polarized light and stereo-chemistry.

VII.—Chemical equations and calculations.

VIII.—Volume and weight relation of gases, with methods of analysis.

IX.—The periodic law, giving the tables of Newland, Mendeleeff, and Lothar Meyer.

X.—Solutions.

XI.—Energy—chemical affinity.

XII.—Thermal relations—thermo-chemistry. Giving the determinations of specific heat, calorific power and intensity, and the laws of thermo-chemistry.

XIII.—Photo-chemistry, discusses chemical union and decomposition, physical changes, mode of action, and the measurement of the chemical activity of light.

XIV.—Electro-chemistry, describes electrolysis, the Ion theory, electrical units and quantitative relations.

It is ably supplemented by a bibliography sufficiently comprehensive to meet most requirements. While no attempt has been made to give credit for individual articles referred to in the journal literature, the periodicals themselves are named. And in the bibliography those books which have been consulted in the preparation of the work are specially marked with asterisks. One excellent point in the arrangement is the use, for illustration, of problems completely calculated, leaving nothing to be assumed.

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Section II. expounds the simple and more important gravimetric determinations arranged in the order of increasing difficulty.

Section III. gives an account of volumetric determinations with the preparatory operations.

Section IV. introduces the student to more complex determinations, including the analysis of ores, industrial products, water, food, etc.

Section V.—Gas analysis.

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Contains information on Yttrium, Boron, Aluminum, Scandium, Gallium, Indium, Manganese, Iron, Cobalt, Nickel, Chromium, Molybdenum, Wolfram, Uranium, Vanadium, Tantalium, Niobium, Gold, Platinum, and others of the Platinum Group.

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The author deals with the classification of chemical substances, referring briefly to the periodic law, and quoting Crookes' remarks on the genesis of the elements. Nomenclature, symbols, formulæ, and various laws and theories, next receive attention, as well as thermo-chemistry, crystallography, etc. Several chapters are devoted to analysis, toxicology, descriptions of apparatus and their use, methods employed in chemical work, and the preparation of reagents. Commencing then with the study of oxygen and its compounds, the rest of the book is devoted to the study of inorganic chemistry as specially applied to medicine and pharmacy. Each substance is considered under the following heads: natural occurrence, preparation, physical and chemical properties, characters, tests, adulterations, medicinal uses, pharmaceutical preparations, doses, etc. The book is well illustrated, and the information given in the text is very full, rendering it of great value to every one interested in medicine and pharmacy as practised on the Continent.

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Analyse bactériologique et chimique des Eaux. Par A. Denæyer. Brussels, 1894. Bacteriological and chemical analysis of water.

Les peptones: leur composition, leur analyse. Par A. Denæyer. Antwerp, 1894. Peptones: their composition and analysis.

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Formulaire des Alcaloides et des Glucosides. Par H. Bocquillon-Limousin. Avec une introduction par G. Hayem. Paris: J. B. Baillière et Fils. 16mo. Pp. viii et 313. Formulary of Alkaloids and Glucosides.

Sur l'Éthérification de l'Acide Fluorhydrique. Par Maurice Meslans. Paris: George Carré. 1893. On the esterification of hydrofluoric acid.

Rules for the Estimation of Alcohol in Imported Spirits, with Tables giving the Specific Gravity of Alcohol from .984 to .936. Computed to the Third Place of Decimals. By C. J. H. Warden. Calcutta, 1892: Bengal Secretariat Press. Large 8vo. 414 pp. 10r.

The book is intended for the use of the Bengal Revenue chemists who deal with imported spirits or spirituous liquids. The method of estimation consists in taking 100 C.c. of the liquid, placing this in a copper flask, and washing out the measuring-flask twice with 100 C.c. of water each time. The washings go into the distilling-flask. The distilling arrangement has been designed by Warden. It enables five samples to be worked at one time, so that there are five flasks and five worms, the latter being enclosed in a single water-trough. Before the sample is measured it is cooled in the condensing water, and the distillate is measured at the same temperature—that of iced water. Two hundred C.c. is distilled from the mixture in the flask, and a 100 C.c. sp. gr. bottle is filled with the distillate. This bottle is designed by Warden, being provided with a cap having a capillary hole at the top for the escape of air, but so well fitted to the shoulder of the bottle that the dilute alcohol as it escapes from the stopper-orifice is caught, and thus the weighing becomes independent of temperature since the measurement is made at 60° F.

The alcohol specific-gravity tables extend to 409 pages, and give the U. P. and O. P. percentages *represented by the distillates* between .984999 and .93616. It follows that, as the distillates contain the alcohol of 100 C.c. of the sample in 200 C.c., the alcoholic percentages are actually double what the specific gravities represent. Although this is explained in the preface, the title-page is not strictly correct. However, the tables are intended for the Revenue chemists, and this way of putting it is best for them. We must congratulate the author on the completion of what must have been a herculean task, but the fact that the tables are the fullest existing is a "feather in his cap" which he is not likely to be called upon to hand over to another. It may be explained that the tables represent 49,000 distinct calculations. We have compared a selection of the factors with other alcohol tables and find them to agree. (Chem. and Drug.)

Spiritus-Schenksteuer und Weingetränksteuer-Ausrechnungs- ferner Spiritus-Alkohol, Traubenmaische-und Weinmost-, wie auch Gebinde-Ausmessung- Umrechnungs- Tabelle. M. M. Hoffmann. Versehen auch mit der Namensliste der ungarländ Spiritus-Producenten. Budapest: Carl Grill.

American Soaps. A Complete Treatise on the Manufacture of Soap, with Special

References to American Conditions and Practice. By Henry Gathmann. Containing many practical additions and suggestions by a number of well-known and successful soap manufacturers. Cloth, 334 pages, 74 engravings. Chicago: Henry Gathmann.

Les Produits Chimiques employés en Medecine, Chimie Analytique et Industrielle. Auguste Trillat; introduction par P. Schutzenberger. Paris: Balliere et Fils.

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Lehrbuch der Chemie und Chemischen Technologie für höhere Handelslehranstalten. Mit einen Anhang: Uebersichtliche Anleitung zur qualitativen chemischen Analyse der wichtigsten Mineralverbindungen. J. Mitteregger u. A. Effenberger.

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Handbuch der organ-tech. Chemie. S. P. Sadtler. Deutsch von J. Ephrain. 1. Abtheilung. Leipzig: J. A. Barth.

L'eau dans l'industrie. P. Guichan. 1 vol. in 12 de 404 pages avec 80 figures.

Die Fabrikation der Parfümerie-Waaren. M. Hauer. Weimar: B. F. Voigt.

Amber: All About It. J. G. Haddow. Liverpool: Cope Brothers and Co.

A Guide to the Examination of Urine. J. W. Legg. 7th Ed. Revised and edited by H. L. Jones. London: H. K. Lewis.

Analysis of Milk and Milk Products. H. Leffmann and W. Beam. Philadelphia: Blakiston, Son and Co. 8vo., pp. 89.

Kleine Tafeln zur Berechnung der abgekürzten Milchuntersuchung. J. Mesius. Bremen: M. Heinsius.

Micro-Organisms in Water—Their Significance, Identification and Removal. Together with an Account of the Bacteriological Methods employed in their Investigation. Especially Designed for the Use of those Connected with the Sanitary Aspects of Water Supply. By Mr. and Mrs. Percy Frankland. London and New York: Longmans, Green and Co. The work contains instructions on the preparation of culture media, sterilization, staining of micro-organisms for microscopical examination. Examination of water for microbia and collection of samples. Comparison of the bacteria contents of various waters. Purification of water for drinking purposes. Pathogenic bacteria in water. Detection of and vitality of typhoid, cholera, anthrax and other pathogenic bacteria. The action of light upon micro-organisms in water and culture media. The appendix contains the forms of bacteria magnified to about 700 diameters. Under each species we find its action upon gelatin, the authority for details, its locality, its microscopic appearance, its cultures, and remarks on its pathological action.

Bulletin of the Sugar Experiment Station, Audubon Park, New Orleans, La. W. C. Stubbs, Director. Issued by the Bureau of Agriculture, Nos. 24–26, 1894.

Analyse des Wassers. Anleitung zur Untersuchung des Trinkwassers. J. A. Wanklyn. Autoris. Uebersetzung der 8. Auf. von H. Borckert. Charlottenburg: Otto Brandner.

Die Fabrikation der Mineral und Lackfarben, Enthaltend: Die Einleitung zur Dar stellung aller künstlichen Maler und Anstreicherfarben, der Email-Russ und Metallfarben. Ein Handbuch für Fabrikanten, Farbewaarenhändler, Maler und Anstreicher, Dem Neusten Stande der Wissenschaft ensprechend dargestellt von Joseph Bersch, mit 43 Abbildung. Zweite, neubearbeitete Auflage. Wien, Pest, Leipzig: A. Harteleben, Verlag, 1893.

The Manufacture of the Mineral and Lake Colors. A hand-book for manufacturers and dealers in paints, painters, etc. The contents of the work may be divided into four parts, the first being introductory in character, describing the physical and chemical characteristics of the various raw materials used and the general processes of manufacture.

The second part deals with the manufacture of the mineral colors, the pigments being grouped according to the color which they produce.

The manufacture of colors of organic origin is treated of in the third part of the work. This includes the lakes made by combining a mineral with an organic substance.

The fourth division of the work concerns itself with the examination of colors, and will prove of much practical value, as tables are well arranged, clear and intelligible.

There is also added a chapter on the trade nomenclature of the colors, which is of much interest, though scarcely so complete as it might be.

Animal and Vegetable Fixed Oils, Fats, Butters and Waxes: their Preparation, Properties and the Manufacture therefrom of Candles, Soaps and other Products. By C. R. A. Wright. pp. i–xvi, 1 to 570. With 144 illus. London: C. Griffin and Co.

PERFUMES.

Odorographia: A Natural History of Raw Materials and Drugs Used in the Perfume Industry, including the Aromatics Used in Flavoring. Intended for the Use of Growers, Manufacturers and Consumers. J. C. Sawer. Second Series. London: Gurney and Jackson (Successors to Van Voorst). Brighton: W. J. Smith. 8vo., pp. 523.

The first section, extending over 346 pages, is devoted to Nutmegs and Mace, Sassafras, Massoi, Solidago, Laurus, Benzoin, Canella alba, Winter's Bark, Pimento, Bay, Myrtle, Lindera, Kapur Kachri, Zedoaria, Galangal, Ginger, Grains of Paradise, Angostura, Cardamom, Coriander, Caraway, Dill, Cumin, Thyme, Ajowan, Basil, Anise, Fennel, Elemi, Angelica, Toddolia, Mint, Buchu, Chamomile, Tansy, Eucalyptus, Spikenard, Boldo, various kinds of odorous wax, Myrica, Ladanum, Acorns, Calamus, Souchet, Wintergreen, Spirosa, Salicin, and Populin. The plants here named and the products obtained from them are fully described as regards their physical characters and chemical composition, the results of the numerous researches which have recently added so much to the knowledge of essential oils being summarized in a very intelligible manner.

The second section treats of oils which are products of fermentation, and the third section deals with products of the action of heat on organic materials, as in various kinds of destructive distillation. The fourth section contains supplementary information relating to the subjects already treated of in the first volume, and the last sixty pages describe the botanical characters of a large number of plants which are capable of supplying floral perfumes.

Essenza, profumi e profumerie. L. Gambari. Milano.

Compendium der praktischen Photographie für Amateure und Fachphotographen. F. Schmidt. 2 Aufl. Karlsruhe: Otto Nemnich.

Lechner's photographische Bibliothek. II. R. Lechner's Buchhandlung (Wilh. Müller), Wien.

Praktisches Taschenbuch der Photographie. E. Vogel. Ein kurzer Leitfaden für die Ausübung aller gebräuchlicheren photographischen Verfahren. 3 vermehrte und verbesserte Auflage. Mit vielen Abbildungen und einem ausführlichen Sachregister. Berlin: R. Oppenheim (G. Schmidt).

Kalender für Photographie und verwandte Fächer. Jahrgang 1894. Herausgegeben von Jaffé, 1. Jahrgang. Wien: Moritz Perles.

Deutscher Photographen-Kalender. K. Schivier. Taschenbuch und Almanach für 1894. 13 Jahrgang. Weimar. Verlag der Deutschen Photographen-Zeitung.

Die Photographie im Dienste des Ingenieurs. Bearbeitet von Fried. Steiner. Lief. 2 u. 3 (Schluss). Wien: R. Lechner.

Zeitschrift für Amateur-Photographen. Redaction: Alexander Rzewuski. Davos: Hugo Richter. A new magazine of photography.

Manuale practico di fotografia alla gelatina bromuro d'argento. G. Santoponte. 2 a. Ediz. Livorno.

Handbuch der Photographie. H. W. Vogel. 4 vermehrte und verbesserte Auflage. II. Theil. Das Licht im Dienste der Photographie und die neuesten Fortschritte der Photographischen Optik. Berlin: R. Oppenheim (G. Schmidt).

CHEMISTRY (THEORETICAL).

Theoretische Chemie vom Standpunkte der Avogadroischen Regel und der Thermodynamik. Von Walter Vernst. Mitt 26 Holzschnitten. Stuttgart: Ferdinand Enke.

The newer chemistry. A work on the position of thermodynamics and the kinetic theory ot gases as foundation stones in the structure of chemistry.

Essays on Historical Chemistry. T. E. Thorpe. London and New York: Macmillan and Co.

A series of 13 different chapters devoted to biographical essays on some of the most eminent chemists, from the birth of the Royal Society down to the present time. It includes the following: Robert Boyle, Joseph Priestley, Henry Cavendish, Scheele, Lavoisier, Faraday, Davy, Graham, Wöhler, Dumas, Kopp, Mendelejef. Also an account of the rise and development of synthetical chemistry.

The Alchemical Essence and the Chemical Element. An Episode in the Quest of the Unchanging. M. M. Pattison Muir. London and New York: Longmans, Green and Co. 8vo., pp. 94.

This work contrasts the elements of modern chemistry with the essences dealt with by those interested but bewildered and bewildering writers and thinkers, the alchemists.

Law and Theory in Chemistry. A Companion Book for Students. By Douglas Carnegie. London and New York: Longmans, Green and Co.

Seven short and complete essays on the history and philosophy of chemical science.

Essai de Chemie Synthétique. F. C. Bartlet. Paris: Chamuel and Co.

A review of the theories on the evolution of matter and the periodicity of the elements, and elaborates certain theories in a novel manner.

Der Monismus der Chemischen Elemente. E. Mensel. Liegnitz: Scholz.

A philosophical work on the unity of the chemical elements.

Kurzes Lehrbuch der Chemie nach den neuesten Forschungen der Wissenschaft. W. Ramsay. Unter Mitwirkung des Verfassers bearbeitet von G. C. Schmidt. Mit Zahlreichen in den Text Gedruckten Abbildungen. Anklam: A. Schmidt.

Grundzüge der theoretischen Chemie. Lothar Meyer. 2. Auf. Leipzig: Breitkopf u. Härtel.

Experimental Proofs of Chemical Theory: for beginners. W. Ramsay. 2d Ed. New York: Macmillan and Co.

Ueber einige Fundamental-Sätze der Chemie, insbesondere das Dalton-Avogadroische Gesetz. H. Debus. Eine historische Untersuchung zur Ergänzung der Lehr- und Handbucher. Cassel: A. Hölder.

Kritische Studien im Bereiche der Fundamentalanschauungen der theoretischen Chemie. C. Glückmann. II. Theil. Wien: F. Deuticke.

THERMO–CHEMISTRY.

Praktische Anleitung zur Ausführung thermochemischer Messungen. M. Berthelot. Uebersetzung von G. Siebert. Leipzig: J. A. Barth.

Technisch-thermochemische Berechnung zur Heizung, insbesondere mit gasförmigen Brennstoffen. A. Naumann. Aufgaben mit ausführlichen Lösungen für Praktikanten und zur Uebung für Studirende. Braunschweig: F. Vieweg u. Sohn.

Die Grundsätze der Thermochemie. Russian Translation. St. Petersburg: C. Ricker.

FOODS AND HYGIENE.

Bibliothek für Nahrungsmittel-Chemiker. Herausgegeben von J. Ephraim. 1 und 2 Band. Leipzig: J. A. Barth.

Die Nahrungs und Genussmittel, ihr Nährwerth, ihre Fehler und Verfälschungen, gemeinfasslich dargestellt. H. F. Wagner. Cassel: M. Brunnemann.

Einführung in das Studium der socialen Hygiene. A. Nossig. Geschichtliche Entwicklung und Bedeutung der öffentlichen Gesundheitspflege. Stuttgart: Deutsche Verlagsanstalt.

Kurzes Lehrbuch der Nahrungsmittelchemie. H. Röttger. Leipzig: J. A. Barth.

Handbuch der Gewerbehygiene. Unter Mitwirkung von E. Claussen, G. Evert, K. Hartmann, W. Oppermann, Th. Oppler, R. Platz, C. Specht, A. Villaret. Herausgegeben von H. Albrecht. 1 Lfg. Berlin: R. Oppenheim (G. Schmidt).

Nature's Hygiene. A Systematic Manual of Natural Hygiene, containing also a detailed Account of the Chemistry and Hygiene of Eucalyptus, Pine and Camphor Forests, and Industries connected therewith. By C. T. Kingzett. 4th Ed. Balliere, Tindall and Cox.

This edition is more systematic than previous editions in its arrangement. It contains an extension of the bacteriological matter; addition of a chapter on alimentation and food, and a discussion of the aerial condition of the turpentines and other essential oils.

Lectures on Sanitation of Industries and Occupations. Published by the Sanitary Institute. London.

Outlines of Practical Hygiene. Adapted to American Conditions. By C. Gilman Currier. N. Y.: E. B. Treat.

Die Biologie als sebständige Grundwissenschaft. Einer kritische Studie von Hans Driesch. Leipzig: W. Engelmann.

Unsere Nahrungsmittel in ihrer Volkswirthschaftlichen und Gesundheitlichen Bedeutung. J. O. Peterson. Eine praktische Ernährungs-lehre für Gesunde und Kranke. Stuttgart: A. Zimmerman.

Grundriss der Hygiene. Karl Flügge. 3 Aufl. Leipzig: Veit u. Co.

Nahrungsmittel-Tafel. F. Kalle. Nebst erläut. Text für den Lehrer. 3 Aufl. Wiesbaden: J. F. Bergmann.

Lehrbuch der Somatologie und Hygiene für Lehrer und Lehrerinnenbildungsanstalten. T. F. Hanausek. Wien: F. Tempsky.

Die rationelle Fütterung der landwirthschaftlichen Nutzthiere. E. Wolff. Grundlage der neueren thierphysiologischen Forschungen. 6 Aufl. Berlin: Paul Parey.

Die Untersuchung von Nahrungsmitteln, Genussmitteln und Gebrauchsgegenständen. Praktisches Handbuch für Chemiker, Medicinalbeamte, Pharmaceuten und Justizbehörden, etc. G. Rupp. Heidelberg: C. Winter.

A Manual of Practical Hygiene, designed for Sanitary and Health Officers, Practitioners and Students of Medicine, with an Introduction by H. A. Hare. D. Bevan and W. M. L. Coplin. Philada.: P. Blakiston, Son and Co.

Enciclopédie d'hygiène et de médecine publique. F. Rochard. London: Macmillan and Co.

Das Conserviren von Nahrungs und Genussmittel. L. E. Andes. Wien: A. Hartleben.

MICROSCOPY AND PHARMACOGNOSY.

Extracts from "Micrographia." By Robt. Hooke. (Alembic Club Reprints, p. 5.) Edinburgh: W. F. Clay. London: Simpkin, Marshall and Co., Lim.

Extracts from Hooke's "Micrographia." A very curious work published in 1665.

Anatomischer Atlas der Pharmacognosie und Nahrungsmittelkunde. Von A. Tschirch und O. Oesterle. T. O. Heigel, Nachfolger. 1893.

Anatomical Atlas of Pharmacognosy and of Foods and their Adulterations.

The first part contains angelica root, German chamomile, tea, capsicum and mustard. Each drug is fully described as regards its anatomical structure, and to make the work more precise, each description is accompanied by a plate showing the different sections and elements of structure. The descriptions are clear and the plates well executed. This work is to appear in 16 to 20 numbers, and judging from the first few numbers will be exceedingly valuable. Each number costs about 50 cents.

Grundriss der Pharmakognosie. Von F. A. Flückiger. Zweite, mit Berücksichtigung technisch wichtiger Pflanzen bearbeitete Auflage. Berlin: R. Gaertner. Pp. 333.

United States Department of Agriculture. Report of the Microscopist for 1892. By Thomas Taylor. From the report of the Secretary of Agriculture for 1892. Washington: Government Printing Office. 1893.

United States Department of Agriculture. Division of Microscopy. Food Products—II. Eight Edible and Twelve Poisonous Mushrooms of the United States, with directions for the culture and culinary preparations of the edible species. By Thomas Taylor. Reprinted from the report of the Secretary of Agriculture for 1890. Second Revised Edition. Washington: Government Printing Office. 1893.

United States Department of Agriculture. Division of Microscopy. Food Products—III. I. Improved methods of distinguishing between pure and fictitious lard. II. Four edible mushrooms of the United States. By Thomas Taylor. Reprinted, with revision, from the report of the Secretary of Agriculture for 1891. Washington: Government Printing Office. 1893.

Modern Microscopy. A Handbook for Beginners. M. I. Cross and Martin J. Cole. London: Ballière, Tindall and Cox.

Transactions and Annual Report of the Manchester Microscopical Society for 1892. Manchester: Pub. by the Soc.

Leitfaden zur Anfertigung mikroskopischer Dauerpräparate. O. Bachman. München: R. Oldenbourg.

Grundzüge einer vergleichenden Anatomie der Blumenblätter. L. Müller. Leipzig: Wm. Englemann.

Der Anatomischer Bau der Laubblätter der Helleboreen. A. Nestler. Leipzig: Wm. Englemann.

Practical Methods in Microscopy. C. H. Clark. Boston: D. C. Heath and Co.

The Microscope and Microscopical Methods. S. H. Gage. 5th Ed. Ithaca, N. Y.: Comstock Pub. Co.

Études microscopiques de produits alimentaires: (a) Histologie et Morphologie comparées des Tests des Graines entrant dans la Composition normale des Principaux tourteaux alimentaires. P. Claes et E. Thyes. Brüssel: Ramlot.

Zimmerman's Botanical Microtechnique. Translated from the German. By J. E. Humphrey. 1 Oct. Vol., pp. xii. and 296. New York: H. Holt and Co.

A Manual of Microchemical Analysis. H. Behrens. Introductory chapter by J. W. Judd. With 84 illustrations by the author. London and New York: Macmillan and Co. Small 8vo., pp. 246.

The author says: "By assiduous study microchemical analysis will be developed into a system that will rival blowpipe analysis as regards its rapidity and its unassuming character with regard to space and laboratory appliances, and in many instances surpass blowpipe analysis in the variety and delicacy of its tests."

Part I. Microchemical apparatus, reagents and reactions.

Part II. Systematic scheme for the examination of mixed compounds, both liquids and solids. Directions for qualitative water analysis, arranged for samples of about 40 C.c., and dispensing with cumbrous appliances. By the methods laid down, water may be tested for K, Na, Ca, Mg, Pb, Cl, P, S, CO_2, NH_3 and HNO_2.

Le Microscope, les Applications. Par H. Beauregard. 1 vol. brocké. A work in the technique of the microscope and its application in microbiology.

Guide Pratique pour la Détermination des Poudres Officinales. E. Collin. Paris: Octave Doin.

This work consists of a series of plates illustrating the histological characters of the simple vegetable powders of the last edition of the French Codex. The subject matter is divided into eight sections, each of which treats of a particular class of drugs, such as roots, barks, etc. An introductory chapter deals with powders in general, and the treatment by which they may be rendered suitable for microscopical examination. Each section is also preceded by a prefatory chapter, in which the general characters of the class of drugs to be dealt with are described, and attention directed to those tissues which are likely to furnish characters of diagnostic value; these chapters cannot fail to prove of the greatest use to every student. Ninety-two powders are illustrated, and the work is published at the moderate price of four francs.

PHARMACY.

Handbuch der Drogisten-Praxis. G. A. Buchheister. Ein Lehr und Nachschlagebuch für Drogisten, Farbwaarenhändler, etc. Im Entwurf vom Drogisten-Verband preisgekrönte Arbeit. Mit einem Abriss der Allgemeinen Chemie von R. Bahrmann. 3te, vollständig umgearbeitete und vermehrte Auflage. Mit 217 in den Text gedruckten Abbildungen. Berlin: J. Springer.

Handwörterbuch der Pharmacie. Edited by A. Brestowski. Vienna and Leipzig: W. Braumüller. Parts 5–8. 2m. 40pf. per part.

Hartwich writes upon castor, catechu, cloves, and most important members of the vegetable materia medica; O. Schmidt writes on cassia, cannabis, &c.; the metals and some parts of physical chemistry are treated by Ad. Kwisda, of Vienna; G. Kottmayer, of Komoran, deals with digitalin, quinine, salts, and active principles generally.

Handwörterbuch der Pharmacie. Part 10. Edited by A. Brestowski. Vienna and Leipzig: W. Braumüller.

——— Part 12, 13 and 14. The 14th part comprises all topics of interest to apothecaries and physicians as far as mineral waters.

Enciclopedia generale die farmacia. Dizionario per farmacisti, medici e ufficiali sanitari, diretta dai proff E. Geissler e F. Moeller. Fascicolo primo. h. I.

Kurzes Repetitorium der pharmaceutischen Chemie. (Zugleich als Commentar zu den chem. u. pharmaceut. Präparaten der Pharm. Germ. Ed. III. u. Pharm. Austr. Ed. VII.). Zum Gebrauche f. Apotheker, Chemiker, Physici, Pharmaceuten. Bearb. nach den Werken und Vorlesgn. v. Fischer, Flückiger, Godeffroy, Hager, Schlickum, Schmidt, Schneider, Schwauert, Weidel, u. A. II. Theil: Organische Präparate. Wien: M. Breitenstein.

Essentials of Practice of Pharmacy, arranged in the form of Questions and Answers. Second edition. By Lucius E. Sayre. Philadelphia: W. B. Saunders. Pp. 200.

The British and Colonial Druggists' Diary, 1894.

Proceedings of the Chemists' Assistants' Association. 1892–93. No. ix. London: R. O. Hearson.

Études, Discours et Mémoires Relatifs à la Pharmacie. D. A. Van Bastelaer. Brussels: G. Deprey.

Yearbook of Pharmacy. Comprising abstracts of papers relating to Pharmacy, Materia Medica and Chemistry, contributed to British and foreign journals from July 1, 1892, to June 30, 1893. London: J. and A. Churchill.

It contains ninety pages less than the Yearbook for 1892, and like its predecessors represents the pharmaceutical progress during the period to which it relates.

Jahresbericht der Pharmacie, herausgegeben vom Deutschen Apothekerverein unter Red. von Heinrich Beckurts. The second part of the second volume of this replete work finishes the Jahresbericht for 1892. In this part are contained the subjects of applied chemistry related to pharmacy, toxicology, literature and critique. Besides these are contained two admirable indexes, one of authors and the other of text. The entire work consists of nearly 900 pages, and is especially valuable, as the editor has consulted a large number of publications, many of which are not so generally consulted in this country. The abstracts are quite full in all cases.

Pharmacopœia Helvetica (Switzerland), III. Ed. This is the first official issue of the Swiss government. Previous to this, the first edition of 1865, followed by those of 1872 and 1876, were issued by the authority of the Swiss Pharmaceutical Society; these were accepted by most of the cantons as official. In 1888 the government appointed a commission consisting of pharmacists, physicians and chemists to take the above in hand. The new Pharmacopœia goes into effect July 1st, 1894. The titles of the articles are in Latin, followed by the same expressed in German, French and Italian. Thus: Antifebrin, antifébrine, antifebrina. This is followed by the method of preparation, where necessary or practicable; then tests of identity and impurity; then preservation, and last and best, the maximum and minimum doses. The text is followed by seventeen tables, including those of reagents, volumetric solutions, solubilities of chemicals in water, alcohol and ether, poisons, alcohol, alkali, acid and saturation tables, synonyms, etc. The index is in the three languages, rendering the work of ready access to all.

Calendar of the Pharmaceutical Society of Great Britain. 8vo., pp. 552. London: Bloomsbury Square.

This work contains a calendar noting under appropriate dates the various matters of interest to the members of the Society, the meetings of the various committees, the holidays, dates of examinations, the historical sketch of the Society, the charter of the Society, the various acts relating to pharmacy, sales of poison and registration, the lists of members, students, prize men, tables of weights and measures, subscribers to the Benevolent Fund and Orphan Fund.

The Pharmacopœia of the United States of America. Seventh decennial revision. 1890. By authority of the National Convention for revising the Pharmacopœia, held at Washington, A. D. 1890. Official after January 1, 1894. Published by the Committee of Revision. 1893.

Select Tables from the U. S. Pharmacopœia (1890). Reprinted for ready reference in daily practice. Philadelphia: P. Blakiston, Son and Co.

The collection contains the following tables:

1. Alphabetical List of Volumetric Assays.
2. List of the Pharmacopœial Chemicals and Reagents.
3. Table of Atomic Weights.
4. Multiples of some Atomic and Molecular Weights.
5. Thermometric Equivalents.
6. Alcoholometric Table.
7. Saturation Tables.
8. Equivalents of Weights and Measures.
9. Equivalents of Measures of Length.

The Era Key to the U. S. P. Published by D. O. Haynes & Co., Detroit, Mich.

Pharmacopœa Danica, 1893. Kjöbenhavn: H. Hagerups, Forlag, 1893.

The National Dispensatory, containing the natural history, chemistry, pharmacy, actions and uses of medicines; including those recognized in the Pharmacopœia of the United States, Great Britain and Germany, with numerous references to the French Codex. By Alfred Stillé, John M. Maisch, Charles Caspari, Jr., and Henry C. C. Maisch. Fifth edition. Philadelphia: Lea Bros. & Co. 1894. Large 8vo., pp. 1903.

The Dispensatory of the United States of America. By Geo. B. Wood and Franklin Bache. Seventeenth Edition. By H. C. Wood, Joseph P. Remington, and Samuel P. Sadtler. Philadelphia: J. B. Lippincott Company. 1894. Pp. 1930.

The Student's Dictionary of Medicine and the Allied Sciences. Comprising the pronunciation, derivation and full explanation of medical terms, together with much collateral descriptive matter, numerous tables, etc. By Alexander Duane.

Der Drogist. Theoretisches und praktisches Handbuch und Lehrbuch für angehende Drogisten zur Vorbereitung auf das Drogisten-Examen. Von Johannes Cracau. Ausgabe A. für Deutschland. Zittau: A. Haase.

Reprints from Montpelier School of Pharmacy:

Sur un Procédé de Preparation extemponaée des Pastilles de Chocolats Medicamentaux. Par Fr. Gay. On a process for the extemporaneous preparation of medicinal chocolate pastilles.

Sur le Tannate de Mercure. Par Fr. Gay. On tannate of mercury.

Sur la preparation et les charactères du Liniment de Rosen. Par Fr. Gay. On the preparation and characteristics of Rosen's liniment.

Essai d'une Classification des Opérations et Formes Pharmaceutiques. Par. Fr. Gay. Attempt at a classification of pharmaceutical processes and manipulations. This is an outline of general galenical pharmacy as taught by the author at the Montpelier School of Pharmacy.

Thirty-Seventh Annual Report of the Council of the Pharmaceutical Society of Australasia. 1893. Pp. 1 to 18. Melbourne: College of Pharmacy.

A Synopsis of the British Pharmacopœia Preparations. Designed for the use of Pharmaceutical and Medical Students. By Charles F. Heebner. Cloth, 66 pages. Interleaved. Toronto: J. A. Carveth & Company.

Tratado de materia farmacéutica legal. J. R. Gomez Pamo. Madrid: Nicolás Moya.

Kalender für Apotheker. II. Jahrgang. J. Heyde. Berlin: Fischer's medic. Buchhandlung, H. Kornfeld.

Apothekerkalender für das Deutsche Reich, begründet von Oscar Schlickum, 1894. XII., Jahrg. Fr. Kober. Stuttgart: Erwin Nägele.

Pharmaceutischer Almanach. Herausgegeben von H. Heger. Neue Folge. 19 Jahrgang. 1894. 2 Theile. Wien: Moritz Perles.

Drogisten-Kalender, Deutscher, 1894. Herausgegeben von Ed. Freise. Braunschweig: J. H. Meyer.

Fromme's pharmaceutischer Kalender, für das Jahr 1894. 31 Jahrg. Redigirt von A. J. Sicha. Wien: Carl Fromme.

Cours de Pharmacie. E. Dupuy. Paris: L. Battaille.

Das Apothekenwesen in Preussen. M. Pistor. Berlin: Richard Schoetz.

Farmacopea ufficiale del regno d'Italia. Tip. della Mantellate, Rom.

Oesterr.-ungar. Notiz-Kalender, 1894. S. Mierzenski. Für Drogen- Material- und Farbwaarenhändler. I. Jahrgang. Wien: Fr. Kaiser.

Bericht über das Jahr 1893. E. Merck. Darmstadt, 1894.

Der angehende Apotheker. J. Berendes. II. (Schluss) Band. Halle: Tausch u. Grosse.

This volume treats of botany and pharmacognosy for pharmacists. Contains 472 illustrations.

Manuale del farmacista pratico. C. del Bo. Mailand: Pirola & Cella.

Das Apothekenwesen in Preussen nach deutschem Reichs- und preussischen Landesrecht. M. Pistor. Berlin: R. Scholtz.

Tecnica farmaceutica. S. Plevani. Mailand: L. Vallardi.

Neues pharmaceutisches Manual. E. Dieterich. Unter Beihülfe von E. Bosetti. 6 Auflage. 1 Lief. Berlin: Julius Springer.

Vorschriftenbuch für Drogisten. G. A. Buchheister. Die Herstellung der gebräuchlichsten Handverkaufsartikel. 2 vermehrte Aufl. Berlin: Julius Springer.

Pharmaceutische Uebungspräparate. M. Biechele. Anleitung zur Darstellung, Erkennung, Prüfung und stöchiometr. Berechnung von officinellen chemisch-pharmaceutischen Präparaten. Berlin: J. Springer.

Grundriss der pharmaceutischen Maasanalyse. E. Geissler. Mit Berücksichtigung einiger handels-chemischer und hygien. Analysen. 2 Aufl. Berlin: Jul. Springer.

Die preussischen Apothekengesetze mit Einschluss der reichsgesetzlichen Bestimmungen über den Betrieb des Apothekergewerbes. H. Böttger. Berlin: J. Springer.

Oesterreichische Pharmakopöe. F. C. Schneider u. A. Vohl. Italian Translation. Gorizia: Paternolli.

Tecnica farmaceutica secondo la farmacopea ufficiale ed il codice d'igiene. S. Plevani. Mailand: F. Vallardi.

Helfenberger Annalen für 1892. Redigirt von Fr. Schmidt. Herausgegeben von der chemischen Fabrik von Eugen Dieterich in Helfenberg bei Dresden. I. Heft. 92 Seiten. Berlin: Julius Springer.

This number contains critical studies upon the following: oleic acid; Hübl's iodine-addition-method; lard; balsams; resins and gum resins; wax; charta; emplastra; extracts; iron and manganese preparations; lanolin; liquor ferri acetas; litharge; mel morphinum; olea; tamarind pulp; powders; soaps; sebum; sinapis; tinctures; ung. hydrarg. cin.

Etudes, Discours et Mémoires relatif à la Pharmacie. D. A. Van Bastelaer a. Bruxelles.

Ueber die Entwickelung des Samens der Areca Catechu L. und die Bedeutung der Ruminationen. Inaug.-Dissert von Theod. Osenbrüg. Pamph. 42 pages and 3 plates. Marburg, 1894.

Die Aufgaben der Apothekergehülfen Prüfung. Schmidt. Stuttgart: F. Enke.

Commentar zur Pharmacopoea Germanica mit deutschem Texte. L. A. Buchner. Suppl.-Bd., enthaltend die in der 2 und 3 Ausgabe der Pharmacopoea getroffenen Veränderungen mit besonderer Berücksichtigung der neu aufgenommenen Arzneimittel. 5 Aufl. München: R. Oldenbourg.

A Pharmaceutical Treatise. M. Edmond Dupuy has been for some time engaged in the preparation of a work which promises to be of great interest. The first volume, which has just appeared, extends to 940 pages, and treats of "The History of Pharmaceutical Legislation," and of "Galenical Pharmacy." The former explains the conditions and formalities necessary for practising pharmacy, and the second comprises the definitions of pharmacy and medicaments. Also the various divisions of the latter and an explanation of the various classes of pharmaceutical operations.

PHYSICS.

Electricity and Magnetism. S. R. Bottone. New York: Macmillan and Co.

Fisica. L. Angeli. Parte II. Livorno.

Die dynamoelectrischen Maschinen. S. P. Thompson. Ein Handbuch für Studirende der Electrotechnik. 4 Aufl. Deutsche Uebersetzung von C. Grawinkel. 11 Hefl. Halle a. S.: Wilhelm Knapp.

Physikalisches Prakticum mit besonderer Berücksichtigung der physikalisch-chemischen Methoden. E. Wiedemann u. H. Ebert. 2 Auf. Braunschweig: F. Vieweg u. Sohn.

Physical Measurements : A Student's Manual of a Laboratory Course in Physical Measurements. By Wallace Clement Sabine. Boston : Ginn & Co. 1893. 126 pp., 8vo.

The Dynamo, its Theory, Design and Manufacture. C. C. Hawkins and F. Wallis. New York : Macmillan and Co.

Notes on Recent Researches in Electricity and Magnetism : Intended as a Sequel to Clerk's Maxwell's "Treatise on Electricity and Magnetism." J. J. Thomson. New York : Macmillan and Co.

Cours élémentaire de machines à vapeur. V. Foulon. Genf : A. Hoste.

Leitfaden der Physik. W. v. Beetz. Leipzig : T. Grieben's Verlag (L. Fernan).

Handbuch der Physik, herausgegeben von A. Winkelmann. 17 Lfg. Breslau : Ed. Trewendt.

——— 19 Lieferung.

——— 2 Band. I. Abtheilung : Optik.

Leitfaden für den Unterricht in der Physik an Ackerbauschulen und landwirthschaftlichen Winterschulen. C. Weber. Stuttgart : Eugen Ulmer.

A Manual of Electrical Science. G. J. Burch. London : Methuen and Co.

Practical Treatise on the Strength of Materials, Including their Elasticity and Resistance to Impact. T. Bose. New York : Spon and Chamberlain.

Recenti progressi nelli applicazioni dell' elettricita. R. Ferrini. 2a edizione completamente rifatta. Parte II. Trasformatori-Distribuzione dell' energia-Motori-Ferrovie elettriche-Applicazioni termiche. Milano.

Lehrbuch der Physik. P. Reis. Einschliesslich der Physik des Himmels (Himmelskunde), der Luft (Meteorologie) und der Erde (physikalische Geographie). 8 Auf. Leipzig : Quandt u. Händel.

Cours de physique expérimentale. H. Schoentjes. Chaleur, magnétisme, électricité, lumière et Chaleur rayonnante. Genf : A. Hoste.

Anfangsgründe der Physik. K. Sumpf. 6 Aufl. Bearbeitet von A. Pabst. Hildesheim : August Lax.

Grundriss der physikalischen Untersuchungsmethoden. C. Seitz. Italian Translation. Milano : F. Vallardi.

Lehrbuch der Physik für hohere Lehranstalten. E. Hoppe. Mit einer Karte der Isogonen und Isoklinen. Leipzig : J. A. Barth.

Los grandes problemas de la Quimica contemporánea y de la Filosofia natural, Discourso de apertura. E. Piñerua y Alvarez. Santiago. 1893.

Measurement of Light and Color Sensations. J. W. Lovibond. A New Method of Investigating the Phenomena of Light and Color by Means of the Selective Absorption in Colored Glass Graded into Scales of Equivalent Color Value.

Lehrbuch der Physik, zum Schulgebrauch bearbeitet. W. Winter. 3 Aufl. München : Th. Ackermann.

Heat : An Elementary Text-Book, Theoretical and Practical, for Colleges and Schools. R. T. Glazebrook. New York : Macmillan and Co. (Cambridge Natural Science Manuals, physical series).

Müller-Pouillet's Lehrbuch der Physik, Meteorologie. 9 Aufl. Von L. Pfaundler unter Mitwirkung von O. Lummer. (In 3 Bänden). 2 Band. 1 Abth. 1 Lief. Braunschweig : F. Vieweg u. Sohn.

Electricity and Magnetism : Elementary Course. C. G. Knott. Philada. : J. B. Lippincott Co.

Koppe's Anfangsgründe der Physik mit Einschluss der Chemie una mathematischen Geographie. Für den Unterricht an höheren Lehranstalten, sowie zur Selbstbelehrung. Ausgabe A. 19 Aufl. Bearbeitet von H. Koppe. Essen : G. D. Baedeker.

Light : An Elementary Text-Book : Theoretical and Practical, for Colleges and Schools. New York : Macmillan and Co.

Psychrometer-Tafeln für das hundertlheilige Thermometer nach H. Wild's Tafeln bearbeitet. C. Jelinek. 4 Aufl. Leipzig: Wilh. Engelmann.

Grundriss der Experimentalphysik für höhere Unterrichtsanstalten. Ch. Sterling. 5 Aufl. Bearbeitet von W. Schafer. Leipzig: H. Haessel.

Optical Experiments: A Series of 150 Experiments, Showing the Laws of the Propagation, Reflection and Refraction of Light. With 24 Woodcuts in the Text. By H. Zwick.

Heat and Light: an elementary Text-Book, theoretical and practical, for Colleges and Schools. R. T. Glazebrook. New York: Macmillan and Co.

Handbook to the Photochromoscope. By its Inventor, F. E. Ives. With Chapters on the Nature of Light and Theory of Color by Some of the first Authorities. Simpkin.

Physikalische Technik. J. Frick. Bearbeitet von O. Lehman. Italian Translation. Torino: Unione tipografico-editrice.

Lehrbuch der Physik für Gymnasien, Realgymnasien, Oberrealschulen und andere höhere Bildungsanstalten. J. Heussi. 6 Aufl., neu bearb. von A. Leiber. Braunschweig: Otto Salle.

Elemente der theoretischen Physik. C. Christiansen. Deutsch von J. Müller. Mit einein Vorwort v. E. Wiedemann. Leipzig: J. A. Barth.

Mach's Grundriss der Physik, für die höheren Schulen des deutschen Reiches. Bearbeitet von F. Harbordt u. M. Fischer. II. Th.: Ausführlicher Lehrgang. Leipzig: G. Freytag.

Einzelbilder aus der Physik. A. Sprockhoff. Die wichtigsten physikalischen Erscheinungen des täglichen Lebens und die gewöhnlichsten gegenstände des täglichen Gebrauchs in Wort und Bild. 7 Aufl. Hannover: C. Meyer.

Der physikalische Unterricht in der Volksschule. A. Heid. Anleitung zum Experimentiren. 2 Aufl. Giessen: E. Roth.

Text-book of Light. R. W. Stewart. 2nd Ed. Cr. 8vo. Clive.

Tutorial Physics. Vol. 3. Text-Book of Light. R. W. Stewart. 2nd Ed. Clive. (Univ. corr. coll. tutorial Series).

THERAPEUTICS.

Les Products Chimiques Employés en Médicine. A. Trillat. Introduction par P. Schutzenberger. Paris: J. B. Baillière and Sons.

Section I. Historical. Antiseptics with figures of bacilli; culture and destruction of these bacilli, the relations between chemical constitution and physiological action.

Section II. Manufacture and properties of medicinal preparations derived from the fatty series, *e. g.*, ether, chloroform, chloral, sulphonal, etc.

Section III. Manufacture and properties of medicinal preparations derived from the aromatic series. Distillation and rectification of tar from wood and oils and methods of preparation of the important group of disinfectants and allied compounds. Analytical characters of the principal medicinal products and the methods for recognizing the same.

Kosmetik für Aerzte. H. Paschkis. 2te vermehrte Auf. Wien: Alfred Holder.

A work treating of preparations for beautifying the hair, nails, skin and mouth.

Die Arzneimittel der Apotheken, alte, wie neue und neueste. Ihre Beschaffenheit, Dosirung und Anwendung, für den practischen Gebrauch des Receptars, sowie zum Studium der angehenden Gehülfen bearbeitet unter Mitwirkung von Stöcker. E. Seegröw. Jurjew (Dorpat): E. J. Kaow.

Lehrbuch der Arzneimittel-Lehre. J. Moeller. Wien: Al. Hölder.

An Illustrated Encyclopædic Medical Dictionary, being a dictionary of the technical terms used by writers on medicine, and the collateral sciences in the Latin, English, French and German languages. By Frank P. Foster, with the collaboration of Wm. C. Ayres, Edward B. Bronson, Chas. Stedman Bull, Henry C. Coe, Andrew F. Currier,

Alex. Duane, Simon H. Gage, Henry J. Garrigues, Chas. B. Kelsey, Russell H. Nevins, Burt G. Wilder. Vol. IV. New York: D. Appleton & Co. 1894. 4to. Pp. 2321 to 3096.

This volume extends from Minnequa Springs to and including Zythum, and completes a valuable and elaborate work. Partaking of an enclycopædic character, it becomes much more interesting than an ordinary dictionary. Illustrations have been inserted wherever they were found necessary to elucidate the text. The frontispiece consists of a colored plate, illustrating urinary sediments.

Die Arzneimittel der Organischen Chemie. Thoms.

This little book of 174 pages contains an incredible amount of valuable matter arranged in tabular form. This includes all the synthetic remedies, with, in addition, such products belonging to the classes of volatile oils, camphors, alkaloids, glucosides, ferments, organic acids, etc., that find employment in medicine. Under division name and formula are given the chemical terms, synonyms, empiric and structural formulæ. Under second division are given the methods of preparation, concisely as possible. The third division includes a description, as to appearance, melting or boiling point, solubilities, etc. The fourth division includes medicinal uses, with doses. Philadelphia: Lea Bros. and Co.

A Dictionary of Medical Science. Containing a full explanation of the various subjects and terms of Anatomy, Physiology, Medical Chemistry, Pharmacy, Pharmacology, Therapeutics, Medicine, Hygiene, Dietetics, Pathology, Surgery, Bacteriology, Ophthalmology, Otology, Laryngology, Dermatology, Gynæcology, Obstetrics, Pediatrics, Medical Jurisprudence and Dentistry, etc., etc. By Robley Dunglison. Edited by Richard J. Dunglison. New (21st) edition, thoroughly revised, greatly enlarged and improved with the Pronunciation, Accentuation and Derivation of the Terms, in one magnificent Imperial octavo volume of 1181 pages. Philadelphia: Lea Brothers & Co.

Annual of the Universal Medical Sciences. A yearly report of the progress of the general sanitary sciences throughout the world. Edited by Chas. E. Sajous, and assisted by over 200 corresponding editors, collaborators and correspondents. Illustrated with chromo-lithographs, engravings and maps. The F. A. Davis Company, Philadelphia, New York, Chicago and London. Australian agency, Melbourne, Victoria. 1893.

Outlines of the History of Medicine and the Medical Profession. By John Hermann Baas. Translated, and in conjunction with the author revised and enlarged by H. E. Handerson. N. Y.: J. H. Vail and Company.

A Practical Treatise of Materia Medica and Therapeutics. By Roberts Bartholow. Cloth, 8vo., pp. 820. Eighth edition, revised and enlarged. New York: D. Appleton & Co., 1893.

A Text-Book of Practical Therapeutics, with Especial Reference to the Application of Remedial Measures to Disease and their Employment upon a Rational Basis. By Hobart Amory Hare. Third Edition. Enlarged and thoroughly revised. Philadelphia: Lea Brothers & Co., 1892.

Materia Medica, Pharmacology and Therapeutics, Inorganic Substances. Charles D. F. Phillips (Edinburgh). London: J. and A. Churchill.

"*A Handbook of Medical Therapeutics.*" By Allen, Harte, Harlan, and Van Harlingen. Edited by Harrison Allen. Octavo, 500 pages. P. Blakiston, Son & Co., Philadelphia.

A Practical Treatise on Materia Medica and Therapeutics, with Especial Reference to the Clinical Application of Drugs. By John V. Shoemaker. Second Edition. Thoroughly revised. Volume II. An Independent Volume upon Drugs. Philadelphia and London: The F. A. Davis Co. 1893.

A Handbook of Local Therapeutics. Edited by Harrison Allen. 8vo., pp. 505. Philadelphia: P. Blakiston, Son & Co., 1893.

The Pharmacology of the Newer Materia Medica. The Botany, Chemistry, Pharmacy, and Therapeutics of New Remedies. Geo. S. Davis, Detroit, Mich.

Weekly Medical Review Pocket Reference Book and Visiting List. Perpetual. St. Louis: J. H. Chamber & Co. 1893.

The Year-Book of Treatment for 1893 (Ninth Year). A Critical Review for Practitioners of Medicine and Surgery. Cloth, small 8vo., pp. 496. Philadelphia: Lea Brothers & Co. 1893.

Leonard's Physician's Pocket Day-Book. Bound in red morocco, with flap, pocket and pencil loop. Published annually by the Illustrated Medical Journal Company, Detroit, Michigan.

The Medical News Visiting List for 1894. Weekly (dated, for thirty patients); monthly (undated, for 120 patients per month); perpetual (undated, for thirty patients weekly per year); and perpetual (undated, for sixty patients weekly per year). The first three styles contain 32 pages of data and 176 pages of blanks. The sixty patients perpetual consists of 256 pages of blanks. Each style in one wallet-shaped book, pocket, pencil, rubber, and catheter scale, etc. Philadelphia; Lea Brothers & Company. 1893.

The French Doctor's Book. A Collection of 1,200 Favorite Prescriptions by the most eminent Foreign Physicians. Compiled by N. Gallois. English Translation. Cloth. 124 pages. Boston: W. Von Bergen.

Die Technik der Verbandstoff-Fabrication. Ein Handbuch der Herstellung und Fabrikation der Verbandstoffe, sowie der Antiseptica und Disinfectionsmittel auf neuester wissenschaftlicher Grundlage für Aerzte, Apotheker, Techniker Industrielle und Fabrikanten. Mit 17 Abbildungen von Theodor Koller. Wien, Pest, und Leipzig: A. Hartleben's Verlag. 1893.

Compendium der Arzneiverordnungslehre für Studirende und Aerzte. R. Kobert. Zweite erweiterte Aufl. Mit 121 Abbildungen. Stuttgart: F. Enke.

The Student's Handbook of Medicine and Therapeutics. A. Wheeler. London: Livingstone.

A Manual of Medical Treatment or Clinical Therapeutics. By J. Burney Yeo. London: Cassell and Co., Limited. 2 vols.

The A. B. C. Pocket Diary and Memorandum Book for Physicians and Pharmacists, 1894. London: Burroughs, Wellcome and Co.

Edinburgh Medical School Calendar and Guide to Students, 1893–94. Edinburgh: E. and S. Livingstone.

Therapeutic Terms for Pharmacists and Physicians. By H. M. Whelpley, M. D. St. Louis, Mo., 1894. Published by the author. Pp. 68.

Formulaire des Médicaments Nouveaux et des Médications Nouvelles. Pour 1894. Par H. Bocquillon-Limousin. Introduction par le Dr. Huchard. Cinquième édition. Paris. J. B. Baillière et Fils. 1894. 16mo. Pp. 314. Formulary of New Remedies and Novel Medications for 1894. This work includes about 500 articles relating to the newer materia medica.

Les nouveaux Hypnotiques, étude experimentale et critiqae. Par Georges Houdaille. Paris: Baillière et Fils.

The Origin and Growth of the Healing Art. A popular history of medicine in all ages and countries. E. Berdoe. London: Swan, Sonnenschein and Co.

Medical Symbolism in Connection with Historical Studies in the Arts of Healing and Hygiene. Thomas S. Sozinskey, F. A. Davis, Philadelphia and London, Publishers.

This treatise treats of the origin and use of symbols in connection with the medical art, and necessarily deals with the mythology of medicine. The various chapters are devoted to remarks on the meaning of symbols, the serpentine god of medicine at Rome, the Æsculapian staff and serpent, the Epidaurian oracle, Dibbara, the god of pestilence, Hygeia, the goddess of health, medical amulets and talismans, pharmacists' symbols, etc. In the chapter on pharmacists' symbols, the author writes: "The art of the pharmacist is old; it is assuredly of prehistoric origin. The reader of Dioscorides or of Pliny is astonished at the number of herbs and other things used as medicines, and the complexness of many popular prescriptions. * * * In other days than ours there was evidently a morbid taste for the multiplication of remedies of doubtful worth—a deplorable infirmity of many physicians. * * * * Although the establishment of the pharmacist has mysteries in abundance connected with it, the special symbols pertaining to the business are but few. The chief and most characteristic one is the mortar and pestle. * * * * Bottles or vases, colored or containing colored liquids, are of pharmaceutic import. The question of their origin is often asked. It cannot be definitely answered. (West. Drug.)

Handbook of the Use of Compressed Oxygen. By K. S. Murray. London: Ede, Dearberg and Co.

What to do in Cases of Poisoning. Wm. Murrell. 7th Ed. London: H. K. Lewis.

Non-Toxic Remedies. F. von Heyden Nachfolger. London: Pardon and Sons.

Wright's Improved Physicians', Surgeons' and Consultants' Visiting List for 1894. Compiled by R. Simpson. Bristol: John Wright and Co.

Die neueren Arzneimittel. B. Fischer. 6. vermehrte Auflage. Berlin: J. Springer. For druggists and physicians.

Lehrbuch der Arzneiverordnungslehre für Thierärzte. E. Fröbner. 2. Aufl. Stuttgart: Ferd. Enke.

Materia Medica, Pharmacology and Therapeutics—Inorganic Substances. C. D. F. Phillips. 2nd Ed., pp. i.–xiv., 1 to 898. London: J. and A. Churchill.

A complete and valuable work on this subject.

TOXICOLOGY AND PHYSIOLOGY.

Kurzes Repetitorium der Toxicologie. I. Chem. Nachweiss. II. Pathologie und Therapie der Vergiftungen. Wien: M. Breitenstein.

Kurzes Repetitorium der Toxicologie. Als Vademecum für Aerzte, Apotheker, Chemker, Physici, Mediciner, Pharmaceuten u. A. Bearbeitet nach dem Werken und Vorlesungen von Brouardel, Chapuis, Dragendorff, van Hasselt, Henders, Kobert, Lewin, Ludwig, Orfila, Otto, Selmi, Taylor, u. A. I. Chemischer Nachweiss. Forensische Chemie der Vergiftungen. Wien: M. Breitenstein.

A Text-book of the Physiological Chemistry of the Animal Body; including an Account of the Chemical Changes Occurring in Disease. Vol. II. The Physiological Chemistry of Digestion. By Arthur Gamgee. With two chromo-lithographic charts by Spillon and Wilkinson. 8vo., pp. i.–xx., 1 to 528. London: Macmillan & Co.

Analyse des matièrels alimentaires. Gerard et Dufré. Paris: Dunod et Vicq.

The Essentials of Chemical Physiology, for the Use of Students. (Illustrated.) W. D. Halliburton. London: Longmans, Green and Co.

On the Chemistry of the Blood. L. C. Woolridge. London: Paul, Trench, Trübner and Co.

Prakticum der physiologischen und pathologischen Chemie, nebst einer Anleitung zur anorganischen Analyse für Mediciner. E. Salkowski. Berlin: A. Hirschwald.

Traité pratique d'Analyse chimique et de Recherches toxicologiques. G. Guerin. Paris: G. Carre.

Analysis with the blowpipe, spectrum. Reactions for the metals and metalloids. Separation of simple and rarer elements and the principal organic acids. Chemical legal examinations for mineral and organic poisons. Ptomaines. Leucomaines. Reactions and properties of the alkaloids. Chemical analysis of potable waters, etc. Bacteriological examination of water, etc.

Text-Book of Physiological Chemistry. O. Hammarsten. Authorized translation from

the 2nd Swedish Edition, and from the Author's revised and enlarged German Edition, by J. A. Mandel. New York: J. Wiley and Sons.

A Text-Book of the Physiological Chemistry of the Animal Body. A. Gamgee. Vol. II. London: Macmillan and Co.

Beitrag zur Lehre v. d. Vergiftung auf Grundlage der in Livland vorgekommenen häufigsten Vergiftungsarten. H. Marcusson. Inaug.-Dissert. Univ. Dorpat.

Toxicologische Studien über einige organische Säuren. A. Neuberg. Jurjew: E. J. Karow.

Die Mineral und Thiergifte. H. Schünemann. Ihre Natur, Wirkung, und das vorzunehmende Heilverfahren. Braunschweig: O. Salle.

Ueber Entbitterung und Entgiftung der Lupinenkörner. Leo Steiner. Inaug.-Dissert. Universität Halle.

APPENDIX.

ANNUAL MEETING.

The next meeting of the Association will be held at Denver, Colorado, in the month of August, beginning on Wednesday the 14th.

The following programme has been approved by the Council:

Wednesday, August 14,	9:30 a. m.	Council Meeting.
	3:30 p. m.	First General Session.
	9:00 p. m.	Reception.
Thursday, August 15,	10:00 a. m.	Second General Session.
	3:30 p. m.	Section on Commercial Interests.
Friday, August 16,	10:00 a. m.	Section on Scientific Papers.
	3:30 p. m.	Section on Scientific Papers.
Saturday, August 17,	10:00 a. m.	Section on Scientific Papers.
	3:30 p. m.	Section on Scientific Papers.
Monday, August 19,	10:00 a. m.	Section on Pharm. Education and Legislation.
	3:30 p. m.	Section on Pharm. Education and Legislation.
Tuesday, August 20,	10:00 a. m.	Section on Pharm. Education and Legislation.
Wednesday, August 21,	10:00 a. m.	Final General Session.

A few slight changes may become necessary to meet the wishes of the Committee of Arrangements.

LIST OF COLLEGES AND ASSOCIATIONS

HAVING ACCREDITED DELEGATES TO THE FORTY-SECOND ANNUAL MEETING, HELD AT ASHEVILLE, N. C., WITH THE ADDRESSES OF THEIR PRESIDENTS AND SECRETARIES.

COLLEGES OF PHARMACY.

Name.	*President.*	*Secretary.*
Brooklyn	L. T. Perkins	Flavel N. Bliss.
Chicago	Emil Thiele	Herman Fry.
Cincinnati.	J. U. Lloyd	A. W. Bain.
Louisville	M. C. Peter	Addison Dimmit.
Maryland	Louis Dohme	John W. Geiger.
Massachusetts	Wm. F. Sawyer	C. C. Williams.
Montreal.	Joseph Contant	E. Muir.
National	F. M. Criswell	H. E. Kalusowski.
New York	Samuel W. Fairchild	J. Niven Hegeman.
Philadelphia	Chas. Bullock	W. B. Thompson.
St. Louis	Cyrus P. Walbridge	J. C. Falk.

SCHOOLS OF PHARMACY.

Name.	*Dean.*
Northwestern University	Oscar Oldberg.
Purdue University	Arthur L. Green.

STATE PHARMACEUTICAL ASSOCIATIONS.

	President.	*Secretary.*
Alabama	E. P. Galt, Selma	P. C. Candidus, Mobile.
Arkansas	J. M. Anderson, Pine Bluff	J. F. Dowdy, Jr., Little Rock.
Colorado	Judson W. Turrell, Longmont	Chas. S. Kline, Denver.
Connecticut	James Duggan, Norwich	Frederic Wilcox, Waterbury.
Delaware	Benton Smith, West Philad'a	Fred. W. Fenn, Wilmington.
Florida	F. P. McElroy, Dade City	R. J. Martinez, Jacksonville.
Illinois	Emil Thiele, Chicago.	Frank Fleury, Springfield.
Indiana	Geo. W. Haynie, Evansville	Wm. H. Stocker, Indianapolis.
Kansas	H. H. Hettinger, Wichita	Mrs. M. O. Miner, Hiawatha.
Kentucky	C. J. Clarke, Paris	J. W. Gayle, Frankfort.
Louisiana	John Gazzo, Raceland	Mrs. E. Rudolf, New Orleans.

Maryland	John F. Hancock, Baltimore	John W. Geiger, Baltimore.
Massachusetts	Francis M. Harris, Worcester	W. L. H. Leavitt, Boston.
Michigan	A. B. Stevens, Ann Arbor	F. A. Thompson, Detroit.
Minnesota.	Claus F. Rohde, Waterville	Chas. T. Heller, St. Paul.
Missouri	A. Brandenberger, Jefferson City.	H. M. Whelpley, St. Louis.
Nebraska	Henry R. Gering, Plattsmouth	W. L. Heilman, Tecumseh.
New Hampshire	Albert S. Wetherell, Exeter	Frank L. Way, Manchester.
New Jersey	Geo. W. Parisen, Perth Amboy.	Wm. C. Alpers, Bayonne.
New York.	Chas. F. Fish, Saratoga Springs.	Clay W. Holmes, Elmira.
North Carolina	N. D. Fetzer, Concord	F. W. Hancock, Oxford.
North Dakota	O. Granrud, Grand Forks	W. S. Parker, Liston.
Ohio	C. T. P. Fennel, Cincinnati	Lewis C. Hopp, Cleveland.
Pennsylvania	Willoughby H. Reed, Norrist'n.	Jacob A. Miller, Harrisburg.
Province of Quebec	Joseph Contant, Montreal	E. Muir, Montreal.
Rhode Island	Jas. M. Fenner, Providence	Wm. E. Cates, Providence.
South Carolina	A. W. Eckel, Charleston	Philip Wineman, Charleston.
South Dakota	James Lewis, Canton	I. A. Keith, Lake Preston.
Tennessee.	J. F. Voigt, Chattanooga	Will Vickers, Murfreesboro.
Virginia	J. F. Christian, Roanoke	C. B. Fleet, Lynchburg.
Wisconsin.	E. D. Pardee, Wausau	E. B. Heimstreet, Janesville.

COUNTY AND CITY ASSOCIATIONS.

	President.	*Secretary.*
Kings Co. (N. Y.)	L. T. Perkins	F. N. Bliss.
Norfolk and Portsmouth		J. W. Thomas, Jr.
N. Y. Germ. Apothecaries.	V. Kostka.	

ALUMNI ASSOCIATIONS OF COLLEGES OF PHARMACY.

	President.	*Secretary.*
Chicago.	James A. Lydston	Chas. C. Thiel.
Maryland	John H. Hancock	Robt. G. Loy.
New York	Herman Graeser	Harry Hiller.
Philadelphia	W. Lincoln Cliffe	W. E. Krewson.
St. Louis	Chas. A. Lips	T. F. Hagenow.

AMERICAN MEDICAL ASSOCIATION.

Wm. B. Atkinson, M. D., *Permanent Secretary.*

LIST OF MEMBERS IN ATTENDANCE AT ASHEVILLE.

Names of delegates indicated by *.

* Alexander, M. W., St. Louis, Mo.
* Alpers, Wm. C., Bayonne, N. J.
* Anderson, J. M., Pine Bluff, Ark.
* Baker, T. Roberts, Richmond, Va.
Bartells, Geo. C., Camp Point, Ill.
* Bartley, E. H., Brooklyn, N. Y.
Beal, J. H., Scio, O.
Berryhill, H. P., Connellsville, Pa.
Bobbitt, J. H., Raleigh, N. C.
Bradley, Augustus, Raleigh, N. C.
* Burge, Jas. O., Nashville, Tenn.
* Butler, F. H., Lowell, Mass.
* Candidus, P. C., Mobile, Ala.
* Carter, Frank H., Indianapolis, Ind.
* Caspari, Chas., Jr., Baltimore, Md.
Casper, J. T., Springfield, O.
* Chalin, Louis F., New Orleans, La.
Chears, H. R., Plymouth, N. C.
* Christian, J. F., Roanoke, Va.
Cole, H. W., Danville, Va.
Connor, L. Myers, Dallas, Tex.
Cornell, E. A., Williamsport, Pa.
* Criswell, F. M., Washington, D. C.
* Culbreth, D. M. R., Baltimore, Md.
* Dadd, John A., Milwaukee, Wis.
* Diehl, C. Lewis, Louisville, Ky.
Dohme, Alfred R. L., Baltimore, Md.
* Dohme, Chas. E., Baltimore, Md.
* Drury, Linus D., Boston, Mass.
Eagny, James T., New Haven, Conn.
* Ebert, Albert E., Chicago, Ill.
* Eccles, R. H., Rockland, Mass.
Ehrlicher, H. M., Pekin, Ill.
* Eichberg, Julius H., Cincinnati, O.
Eichrodt, Chas. W., Indianapolis, Ind.
* Eliel, Leo, South Bend, Ind.
Eschman, C. L., Phœnix, Ariz.
Estes, J. J., Brooklyn, N. Y.
* Fennel, Chas. T. P., Cincinnati, O.
* Fetzer, N. D., Concord, N. C.
Firmin, John C., Findlay, O.
* Ford, Chas. M., Denver, Colo.
* Foster, J. Webb, Jr., Baltimore, Md.
* Godbold, F. C., New Orleans, La.
* Godding, J. G,, Boston, Mass.
* Good, James M., St. Louis, Mo.
Gordon, Wm. J. M., Cincinnati, O.
Greve, Chas. M., Chattanooga, Tenn.
* Greve, T. L. A., Cincinnati, O.
* Hallberg, C. S. N., Chicago, Ill.
Hancock, C. W., Philadelphia, Pa.
* Hancock, F. W., Oxford, N. C.
Hardison, James, Wadesboro, N. C.
* Hartwig, Otto J., Chicago, Ill.
* Harvey, John M., Wilmington, Del.
Hechler, Geo. L., Cleveland, O.
Helfmann, Joseph, Detroit, Mich.
* Herbst, Fred'k W., Columbus, O.
* Holmes, Clay W., Elmira, N. Y.
* Holzhauer, Chas., Newark, N. J.
* Hopp, Lewis C., Cleveland, O.
* Horne, H. R., Fayetteville, N. C.
Hoyt, Geo. M., E. Weymouth, Mass.
* Hurty, John N., Indianapolis, Ind.
Ingalls, John, Macon, Ga.
Jacobs, Joseph, Atlanta, Ga.
Johnson, D. D., Concord, N. C.
Kauffman, Geo. B., Columbus, O.
Kebler, Lyman F., Philadelphia, Pa.
Kelly, Gilliam G., Atlanta, Ga.
* Kennedy, Geo. W., Pottsville, Pa.
Knoefel, C. D., New Albany, Ind.
Kraemer, Henry, New York, N. Y.
Land, R. H., Augusta, Ga.
* Legendre, J. A., New Orleans, La.
* Levy, Wm. M., New Orleans, La.
Lloyd, J. U., Cincinnati, O.
* Main, Thos. F., New York, N. Y.
Mason, Alfred H., New York, N. Y.
Mayo, Caswell A., New York, N. Y.
McDonald, Geo., Kalamazoo, Mich.
* McIntyre, Wm., Philadelphia, Pa.
Mebane, R. S., Greensboro, N. C.
* Meissner, F. W., Jr., La Porte, Ind.

* Milburn, John A., Washington, D. C.
Miller, Polk, Richmond, Va.
Miner, O. E., Noank, Conn.
* Mohr, Chas. A., Mobile, Ala.
* Morrison, Joseph E., Montreal, Can.
* Muth, Geo. L., Baltimore, Md.
Nattans, Arthur, Washington, D. C.
* Newman, Geo. A., Louisville, Ky.
* Nichols, Thos. B., Salem, Mass.
* Oldberg, Oscar, Chicago, Ill.
Osmun, Chas. A., New York, N. Y.
Parker, W. W., Henderson, N. C.
* Parisen. Geo. W., Perth Amboy, N. J.
Patch, Edgar L., Boston, Mass.
* Patton, John F., York, Pa.
Payne, Geo. F., Atlanta, Ga.
* Pfeiffer, John, Brooklyn, N. Y.
* Plenge, Henry, Charleston, S. C.
Rains, A. B., Columbia, Tenn.
* Ramsperger, Gust., New York, N. Y.
* Read, Albert M., Washington, D. C.
Reidy, Michael, Corunna, Mich.
* Remington, Joseph P., Philadelphia, Pa.
Robinson, E. A., Lowell, Mass.
Robinson, Jas. C., Memphis, Tenn.
Royster, Oliver M., Hickory, N. C.
Ryan, Frank G., Philadelphia, Pa.
Sample, E., Ironton, O.
* Sawyer, W. F., Boston, Mass.
* Sayre, Lucius E., Lawrence, Kans.
Schlotterbeck, J. O., Ann Arbor, Mich.
* Schuh, Paul G., Cairo, Ill.
Seabury, Geo. J., New York, N. Y.
Sharp, Harry, Atlanta, Ga.
* Sheppard, S. A. D., Boston, Mass.
Sherwood, H. J., Cleveland, O.
Simpson, William, Raleigh, N. C.
* Simon, William, Baltimore, Md.
Slack, Henry R., La Grange, Ga.
* Sloan, Geo. W., Indianapolis, Ind.
Smith, Frank T., Franklin, N. C.
Smith, Linville H., Boston, Mass.
Smith, Whitefoord G., Asheville, N. C.
Sohrbeck, G. H., Moline, Ill.
Solomons, I. A., Savannah, Ga.
Sperry, H. J., New Haven, Conn.
Stedem, F. W. E., Philadelphia, Pa.
* Stein, Jacob H., Reading, Pa.
* Stewart, F. E., Detroit, Mich.
* Thomas, Oscar E., Columbia, S. C.
* Thompson, Wm. S., Washington, D. C.
Tigner, J. O., Greenville, Ga.
* Tilden, Amos K., Boston, Mass.
Turner, Jno. P., Columbus, Ga.
* Vaughan, P. W., Durham, N. C.
* Vernor, James, Detroit, Mich.
* Vickers, Rufus W., Murfreesboro, Tenn.
Voss, Geo. W., Cleveland, O.
* Watson, S. P., Atlanta, Ga.
Way, David, Waynesville, N. C.
* Whelpley, H. M., St. Louis, Mo.
* Whitney, H. M., N. Andover, Mass.
* Wilcox, Fred'k, Waterbury, Conn.
Wilhite, F. T., Anderson, S. C.
* Williams, Geo. G., Boston, Mass.
Wills, Fred'k M., Charlottesville, Va.
Winters, A., Ironton, O.
Yearby, Wm. M., Durham, N. C.
* Zoeller, E. V., Tarboro, N. C.

LIST OF NEW MEMBERS.

Albright, Emmet C., New Castle, Pa.
Baird, J. W., Boston, Mass.
Bauer, David S., Mobile, Ala.
Beasley, Wm. A., Fairmount, Ind.
Benhard, Albert H., Holyoke, Mass.
Blanding, Wm. O., Providence, R. I.
Bobbitt, James H., Raleigh, N. C.
Boyce, Sam'l R., Lawrence, Kans.
Bradley, Augustus, Raleigh, N. C.
Bradley, Chas. L., Clarksville, Tenn.
Brandenberger, Aug., Jefferson City, Mo.
Braun, Adolf, St. Louis, Mo.
Brisley, Harry, Prescott, Ariz.
Brown, Wm. T., Madison, N. J.
Byrne, John, Columbus, O.
Carr, Will L., Hot Springs, Ark.
Christian, J. F., Roanoke, Va.
Coblentz, Jos. D., Washington, D. C.
Coupe, Robert E., St. John, New Brunswick, Can.
Cox, Wm. A., Scranton, Miss.
Crane, Frank T., Machias, Me.
Crowdle, John E., Newton, Mass.
Cunningham, Mrs. H. M., Houston, Tex.
Curry, David W., Rome, Ga.
Dashill, Robert M., Morrillton, Ark.
Davis, John A., Baltimore Md.
Depeyre, Louis H., Fort Russell, Wyo.
Dixon, John M., Titusville, Fla.
Dowdy, Joseph F., Little Rock, Ark.
Drake, Fred'k T., Stoneham, Mass.
Duggan, James, Norwich, Conn.
Eagny, Jas. T., New Haven, Conn.
Earl, Noble C., Portland, Me.
Edwards, Fred'k B., Hartford, Conn.
Fetzer, Nevin D., Concord, N. C.
Field, James C.; Somerville, N. J.
Fletcher, John W., Batesville, Ark.
Foster, J. Webb, Baltimore, Md.
Freeman, Wm. B., Atlanta, Ga.
French, John I., Woburn, Mass.
Furl, Irwin W., Phœnix, Ariz.
Geiger, Chas. F., Old Orchard, Mo.
Habliston, Charles C., Baltimore, Md.
Hanenkratt, Diebold V., Guthrie, Okl. Ty.
Hardison, James, Wadesboro, N. C.
Hargrave, Benjamin W., Wilson, N. C.
Harris, Francis M., Worcester, Mass.
Hatton, Ellmore W., Columbus, O.
Heebner, Chas. F., Toronto, Can.
Helfman, Joseph, Detroit, Mich.
Hemm, Louis P., Kirkwood, Mo.
Henry, Frank C., Washington, D. C.
Hettinger, Howard H., Wichita, Kans.
Hickerson, Wm. H., Warren, Ind.
Hillbert, Geo. A., Wynnewood, Ind. Ty.
Holland, Geo., Philadelphia, Pa.
Huder, Henry J., Indianapolis, Ind.
Hudson, T. F., Tempe, Ariz.
Hunter, Henry B., Philadelphia, Pa.
Jacobs, Joseph, Atlanta, Ga.
Jacocks, John T., Clarkville, Tenn.
Johnson, Daniel D., Concord, N. C.
Jones, Edward B., Mount Holly, N. J.
Kebler, Lyman F., Philadelphia, Pa.
Keenan, Thomas J., New York, N. Y.
Kelly, Gilliam J., Atlanta, Ga.
Kendrick, Harlan P., Barre, Vt.
Klein, Ernest F., Hot Springs, Ark.
Kline, Chas. G., Harriman, Tenn.
Knoefel, Chas. D., New Albany, Ind.
Lauranson, Louis, Memphis, Tenn.
Levy, Wm. M., New Orleans, La.
Lisle, Justin D., Springfield, O.
Lockert, Chas. L., Clarksville, Tenn.
Lueder. Fritz, Peoria, Ill.
Mason, Harry Ruggles, Newton, Mass.
Mebane, Robert S., Greensboro, N. C.
McLean, George, Orrick, Mo.
Miller, Polk, Richmond, Va.
Miller, Turner A., Richmond, Va.
Miner, Orrin E., Noank, Conn.
Mohr, Chas. A., Mobile, Ala.
Moore, Thomas F., Mobile, Ala.
Morton, John W,, Fort Smith, Ark.
Mosher, W. W., Meriden, Conn.
Mueller, Ambrose, Kirkwood, Mo.
Murray, Emmet L., Americus, Ga.

Muth, Geo. L., Baltimore, Md.
Myers, Geo. W., Oakland, Cal.
Ortmann, John H., Mobile, Ala.
Parker, Walter W., Henderson, N. C.
Pearce, Howard A., Providence, R. I.
Peter, Miner C., Louisville, Ky.
Pfiffner, Fritz J. R., Delaware, O.
Phillimore, Fred. G., Boston, Mass.
Phillips, Carrie E., Cambridge, Mass.
Plaut, Albert, New York, N. Y.
Plenge, Henry, Charleston, S. C.
Potter, Wm. R., Providence, R. I.
Prentiss, John B., Terre Haute, Ind.
Quandt, Arthur A., Baltimore, Md.
Quandt, Ernest E., Baltimore, Md.
Rains, Aris B., Columbus, Tenn.
Rauschkolb, John, Columbus, O.
Read, Albert M., Washington, D. C.
Reidy, Michael, Corunna, Mich.
Rosenthal, D. A., Knoxville, Tenn.
Royster, Oliver M., Hickory, N. C.
Ruddiman, E. A., Nashville, Tenn.
Russell, Dorian M., Grand Rapids, Mich.
Sample, Elmer W., Ironton, O.
Schimpf, Henry W., Brooklyn, N. Y.
Schuh, Paul G., Cairo, Ill.
Sherwood, Henry J., Cleveland, O.
Simson, Wm. A., Halifax, N. S., Can.
Skinner, Wm. H., Pocahontas, Ark.
Smith, Frank T., Franklin, N. C.
Smith, James P., Augusta, Ga.
Smith, Thomas E., Mobile, Ala.
Solomons, I. A., Savannah, Ga.
Sparks, James M., Fort Smith, Ark.
Stewart. Francis E., Detroit, Mich.
Stoehr, Julius J., Garrett, Ind.
Stong, Franz Siegel, Chattanooga, Tenn.
Treherne, J. C., Memphis, Tenn.
Turner, John P., Columbus, Ga.
Vickers, Rufus W., Murfreesboro, Tenn.
Walker, David, Kansas City, Mo.
Way, David, Waynesville, N. C.
Weiser, Wm. A., Bourbon, Ind.
Winters, Aaron, Ironton, O.
Wright, Arthur W., Newark, N. J.
Wyckoff, Elmer E., Rock Island, Ill.
Yearby, Wm. M., Durham, N. C.
Young, Hiram W., Marion, Kans.

LIST OF LIFE MEMBERS.

PUBLISHED IN ACCORDANCE WITH RESOLUTIONS OF THE COUNCIL.

SEE PROCEEDINGS 1888, PAGE 41.

[Names of Life Members under the Old Constitution in *Italics;* under the present By-Laws, in SMALL CAPITALS.]

Abernethy, Maxwell.
Ash, Matthew F.
Baxley, J. Brown.
BAYLEY, AUGUSTUS R.
Berrian, George W.
BIROTH, HENRY.
Blatchford, Eben.
BORING, EDWIN M.
Bower, Henry.
Bullock, Charles.
CANNING, HENRY.
Colcord, Samuel M.
Cummings, Henry T.
CUTLER, EDWARD WALDO.
Dearborn, George L.
Doliber, Thomas.
DRURY, LINUS D.
Du Puy, Eugene.
EBERT, ALBERT E.
Ellis, Evan T.
FOUGERA, EDMUND C. H.
FULLER, OLIVER F.
Gale, Edwin O.
Gale, William H.
Gallagker, Charles K.
Goodwin, Wm. W.
Gordon, Wm. J. M.
Grahame, Israel J.
GRIFFITH, ALBERT R.
Haviland, Henry.
Hay, Henry H.
HEINITSH, CHARLES A.
Heintzelman, Joseph A.
Heyl, James B.
HOLZHAUER, CHARLES.
Hudnut, Alexander.
JACQUES, GEORGE W.
Jenks, Wm. J.
JONES, EDWARD C.
Kent, Robert R.
KESSLER, EDWARD F.
KING, JAMES T.
KLUSSMANN, HERMANN.
LAND, ROBERT H.
LEE, JAMES A.
Leitch, Arthur.
LEMBERGER, JOSEPH L.
LLEWELLYN, JOHN F.
McConville, Thomas A.
McPherson, George.
Mellor, Alfred.
MILBURN, JOHN A.
MILHAU, EDWARD L.
Moffit, Thomas S.
Moith, Augustus T.
Molwitz, Ernest.
Newman, George A.
Ollif, James H.
ORNE, JOEL S.
Paine, James D.
Parr, John C.
Patten, I. Bartlett.
Peabody, William H.
Perot, T. Morris.
PETTIT, HENRY M.
PFINGST, FERDINAND J.
Plummer, David G.
Rano, Charles O.
REMINGTON, JOSEPH P.
Rittenhouse, Henry N.
ROBINSON, JAMES S.
Rollins, John F.
ROSENGARTEN, MITCHELL G.
Russell, Eugene J.
SANDER, ENNO.
SEABURY, GEORGE J.

Sharp, Alpheus P.
Sheppard, Samuel A. D.
Snyder, Ambrose C.
Sweeney, Robert O.
Taylor, Alfred B.
Thompson, William B.
Tufts, Charles A.
Turner, T. Larkin.
Vernon, James.
Wardell, Robert C.
Warner, William R.
White, Aaron S.
Whitfield, Thomas.
Whitney, Henry M.
Wiegand, Thos. S.
Winkelmann, John H.
Winter, Jonas.
Woltersdorf, Louis.
Yorston, Matthew M.
Zeilin, J. Henry.

GENERAL INCORPORATION LAW FOR THE DISTRICT OF COLUMBIA.

SECTIONS APPLICABLE TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

CLASS 3, SOCIETIES, BENEVOLENT, EDUCATIONAL, ETC.

SEC. 545. Any three or more persons of full age, citizens of the United States, a majority of whom shall be citizens of the District, who desire to associate themselves for benevolent, charitable, educational, literary, musical, scientific, religious, or missionary purposes, including societies formed for mutual improvement, or for the promotion of the arts, may make, sign, and acknowledge before any officer authorized to take acknowledgement of deeds in the District, and file in the office of the Recorder of Deeds, to be recorded by him, a certificate in writing, in which shall be stated:

First. The name or title by which such society shall be known in law.

Second. The term for which it is organized, not exceeding twenty years.

Third. The particular business and objects of the society.

Fourth. The number of its trustees, directors, or managers for the first year of its existence.

SEC. 546. Upon filing their certificate, the persons who shall have signed and acknowledged the same, and their associates and successors, shall be a body politic and corporate, by the name stated in such certificate; and by that name they and their successors may have and use a common seal, and may alter and change the same at pleasure, and may make by-laws and elect officers and agents; and may take, receive, hold and convey real and personal estate necessary for the purposes of the society as stated in their certificate.

SEC. 547. Such incorporated society may annually, or oftener, elect from its members its trustees, directors, or managers, at such time and place, and in such manner as may be specified in its by-laws, who shall have the control and management of the affairs and funds of the society, and a majority of whom shall be a quorum for the transaction of business; and whenever any vacancy shall happen among such trustees, directors, or managers, the vacancy shall be filled in such manner as shall be provided by the by-laws of the society.

SEC. 548. The trustees, directors, or stockholders of any existing benevolent, charitable, educational, musical, literary, scientific, religious, or missionary corporation, including societies formed for mutual improvement, may, by conforming to the requirements herein, re-incorporate themselves, or continue their existing corporate powers under this chapter, or may change their name, stating in their certificate the original name of such corporation as well as their new name assumed; and all the property and effects of such existing corporation shall vest in and belong to the corporation so re-incorporated or continued.

SEC. 549. Such corporations may sell and dispose of any real estate they may acquire by purchase, gift, or devise, as follows: whenever any lot purchased for the use of the corporation, or any building erected thereon, shall become ineligible for the uses for which the lot was purchased or the building erected, to be determined by a vote of two-thirds of the shares of the stock of the corporation or the members of the corporation, at a meeting of the stockholders, or corporators, or members specially called for that purpose, the proceedings of which meeting shall be duly entered in the records of the corporation; said lot or building may be sold, and the proceeds thereof may be vested in another lot, or in the erection of another building, or both.

SEC. 550. When any real estate shall have been devised or given to any such corporation for any specified benevolent purpose, and where, by a vote of three-fourths of the stock held by the stockholders, or three-fourths of the corporators, if no shares of stock have been created, at a meeting called for the purpose, of which such stockholders or corporators or members shall have at least ten days' notice, the corporation shall determine to surrender their corporate powers and cease to act under the same, said real and personal estate so acquired shall be sold at public auction, proper notice of the time and place of sale having been given, and the proceeds of the sale equitably distributed among the stockholders or corporators, or disposed of for the promotion and advancement of the objects for which such corporation was originally organized.

SEC. 551. No corporation acting under the six preceding sections shall hold real estate more than five years, except so much as shall be necessary for the purposes named in its certificate.

SEC. 552. The provisions of this chapter shall not extend or apply to any association or individual who shall, in the certificate filed with the Recorder of Deeds, use or specify a name or style the same as that of any previously existing incorporated body in the District.

Approved 5 May, 1870, c. 80, v. 16, pp. 98–116—Revised Statutes of the United States, relating to the District of Columbia.

CERTIFICATE OF INCORPORATION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Whereas, we, the undersigned, desire to form an association having for its object to unite the educated and reputable Pharmacists and Druggists of America, as will more fully hereinafter appear;

Now, therefore, we do hereby certify as follows:

First, The corporate name of the association is the American Pharmaceutical Association.

Second, This association shall continue until dissolved by the action of its members, or by the operation of law.

Third, The objects and business of said association are as follows:

a. To improve and regulate the drug market, by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulterations.

b. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

c. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and in encouraging home production and manufacture in the several departments of the drug business.

d. To regulate the system of apprenticeship and employment, so as to prevent, so far as possible, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

e. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

f. To uphold standards of authority in the education, theory and practice of Pharmacy.

g. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and the greatest protection to the public.

Fourth, The concerns and affairs of the Association shall be managed by a Council, which shall consist for the first year of John U. Lloyd, Maurice W. Alexander, Alexander K. Finlay, Karl Simmon, Samuel A. D. Sheppard, John M. Maisch, James Vernor, C. Lewis Diehl, William H. Rogers, William Saunders, Albert E. Ebert, Philip C. Candidus, George W. Kennedy, Albert H. Hollister, James M. Good, Lewis C. Hopp and William Dupont.

Given under our respective hands and seals this 12th day of December, A. D. 1887.

Signed:

John U. Lloyd,
Maurice W. Alexander,
Alex. K. Finlay,
Karl Simmon,
Samuel A. D. Sheppard,
John M. Maisch,
James Vernor,
C. Lewis Diehl,
William H. Rogers,
Wm. Saunders,
Albert E. Ebert,
Philip C. Candidus,
George W. Kennedy,
Albert H. Hollister,
James M. Good,
Lewis C. Hopp,
William Dupont,

Members of the Council,

And

John A. Milburn,
G. G. C. Simms,
E. B. Bury,
Z. W. Cromwell,
W. S. Thompson,
John R. Major,
Charles Christiani,
W. G. Duckett,
A. J. Schafhirt,
Geo. W. Boyd,
O. H. Coumbe,
Henry A. Johnston,
Geo. B. Lockhart,
W. C. Milburn,
T. C. Murray,
Arthur Nattans,
Joseph R. Walton,
Thomas M. Wehrly,

of the District of Columbia.

(Notaries' certificates attached to the original document attest the genuineness of each and every signature.)

Received for Record February 21st, 1888, at 1 : 05 P. M., and recorded in Liber No. 4, fol. 302, Acts of Incorporation, District of Columbia, and examined.

Signed: James M. Trotter, *Recorder*.

Seal:
Office of Recorder of Deeds,
District of Columbia,
Washington, D. C.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulterations.

2. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a Permanent Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually; also a Local Secretary to be elected by the Council, and shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting, when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

BY-LAWS.

CHAPTER I.

Of the President and Vice-Presidents.

ARTICLE I. The President shall preside at all meetings of the Association, except those of the special Sections, as hereinafter provided. In his absence or inability, one of the Vice-Presidents, or in the absence of all a President *pro tempore*, shall perform the duties of President.

ARTICLE II. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*.

ARTICLE III. In meetings, the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all ballotings, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal; and in case of such equal division, the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in cases of personality and impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in cases where he prefers to submit the matter to the meeting: decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-Laws are properly enforced.

ARTICLE VII. He shall appoint all committees, unless provided for in the By-Laws, or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and countersign all orders on the Treasury. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER II.

Of the Permanent Secretary.

Article I. The Permanent Secretary shall be elected to hold office permanently during the pleasure of the Association. He shall receive from the Treasurer an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

Article II. He shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve, on file, all reports, essays, and papers of every description received by the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Proceedings of the Association, under the direction of the Council.

Article III. He shall read all papers handed him by the President for that purpose; shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act: and shall notify every member of the time and place of each annual meeting.

CHAPTER III.

Of the Local Secretary.

Article I. The Local Secretary shall be elected annually, near the close of the annual meeting, and shall reside at or near the place where the next annual meeting of the Association is to be held.

Article II. He shall assist the Permanent Secretary in his duties: shall co-operate with the Council and any Local Committee in making arrangements for the annual meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

Article III. An exhibition of objects interesting to pharmacists shall be held each year, under the direction of the Local Secretary and the Committee on Commercial Interests.

CHAPTER IV.

Of the Treasurer.

Article I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

Article II. He shall pay no money except on the order of the Secretary, countersigned by the President, and accompanied by the proper vouchers.

Article III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annual contributions for three years.

Article IV. He shall present a statement of his accounts at each annual meeting of the Council, that they may be audited; he shall receive an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE V. The Treasurer, in order that he may qualify for the office to which he has been elected, shall file a good and sufficient bond or bonds to the amount of $5,000 with the Chairman of the Council for the faithful performance of his duties as Treasurer, this bond or bonds to be signed and executed by two sureties or a Trust Company acceptable to the Council.

CHAPTER V.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual sum of $750.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the Permanent Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the Permanent Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materia Medica, and the collateral branches of knowledge; on the changes in conditions of Pharmaceutical Institutions; together with such statistical, biographical and obituary notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting, unless such meeting is held previous to August 1.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the Permanent Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

CHAPTER VI.

Of the Council.

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which shall be empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may, by a special vote of the Council, be invited to speak on any subject under discussion.

ARTICLE II. The Council shall consist of seventeen members, nine of whom shall be elected by ballot by the Association in the following manner: Three of them to serve for one year, three for two years, three for three years. At each subsequent annual meeting, three members shall be elected to take the places of those whose terms will then expire, to serve for the term of three years. No elected member of the Council, after having served one term, shall be eligible for re-election to the Council to serve the next succeeding term.

ARTICLE III. The President, Vice-Presidents, Secretary, Local Secretary, Treasurer, and Reporter on the Progress of Pharmacy of the Association, shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, to be elected by ballot annually by the Council. The Secretary may or may not be a member of the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association from one annual meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the annual meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council—a Committee on Membership, a Committee on Publication, and a Committee on Finance—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section* 1. The Council shall have charge of the revision of the roll and the publication of the Proceedings.

Section 2. The Secretary of the Council shall read at each of its sessions the names of those candidates for membership which have been proposed, when a vote of two-thirds shall be sufficient to recommend them to the Association.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing, with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be voted on by the Association without first receiving the approval of the Council.

Section 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears, one copy of the annual publication of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sittings of the Association, a complete synopsis of the minutes of the Council, the reports of the President and Committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as they may deem worthy of insertion, and shall fix the price at which the Proceedings shall be sold.

CHAPTER VII.

Of Committees.

ARTICLE I. There shall be seven Standing Committees, a Committee on Commercial Interests and a Committee on the Revision of the Pharmacopœia, each to consist of five members; a Committee on Scientific Papers, a Committee on the Ebert Prize, a Committee on General Prizes, and a Committee on Pharmaceutical Legislation and Education, each to consist of three members; and a Committee on Transportation, to consist of nine members.

ARTICLE II. The Committee on Commercial Interests shall be elected by the Section on Commercial Interests. They shall be charged with the work of arranging in advance the business to come before the Section at the next annual meeting. They shall propose each year a subject for discussion at the meetings of the State Associations, and at the following annual meeting of this Association they shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE III. The Committee on Scientific Papers shall be elected by the Section on Scientific Papers. They shall arrange the business of the Section, and shall report, near the close of each annual meeting, a proper number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person writing a paper for the Association must, to insure its publication in the Proceedings, refer the same, with a synopsis of its contents, to the Committee on Scientific Papers previous to the first session.

ARTICLE V. It shall be the duty of every Standing Committee making a report annually to the Association, in like manner to furnish a copy of the same, together with a synopsis of its contents, to the Committee on Scientific Papers before the first annual session of the Association.

ARTICLE VI. The Committee on the Ebert Prize, which shall be appointed by the Chairman of the Section on Scientific Papers, shall, within six months after the annual meeting at which the essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all other respects they shall be governed by the stipulations expressed by the donor. The decision of the Committee, with such comments upon the successful essay only as they may deem proper, may be published in the Journals of Pharmacy.

ARTICLE VII. The Committee on General Prizes, which shall be appointed by the President, shall within six months after the annual meeting, at which the papers are presented, determine which, if any of them, are worthy of prizes, and decide upon the relative merits of such papers as are deemed worthy.

ARTICLE VIII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Education, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on pharmaceutical subjects has occurred during the year. They shall arrange the business of the Section in advance of its meetings, propose suitable subjects for discussion, and shall attend to such duties as may be delegated to them by the Section.

ARTICLE IX. The Committee on Revision of the United States Pharmacopœia shall be appointed by the President of the Association. It shall be their duty to collect and codify such facts as may serve as a basis of the report to be presented by this Association to the National Convention for revising the Pharmacopœia. It shall collect statistics regarding the frequency with which official and non-official remedies are used in legitimate practice, and shall endeavor to ascertain the general wishes and feelings of the profession throughout the country in regard to any desired changes or improvements in the Pharmacopœia.

ARTICLE X. The Committee on Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, Denver and San Francisco, and in conjunction with the Local Secretary shall arrange for transportation from the different sections of the United States to the place of meeting and return.

CHAPTER VIII.

Of Membership.

ARTICLE I. Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry and Botany, who may be especially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of the Constitution and By-Laws, are willing to subscribe to them, are eligible to membership; provided that no one, whose name has been dropped from the roll for non-payment of dues, shall be eligible for membership until payment has been made of the three years' dues for which he is in arrears.

ARTICLE II. Any two members of the Association may propose to the Council the name of any person eligible to membership, and if approved, the Council shall recommend the person named to the Association, and post the name in some suitable place in the meeting hall, near the beginning of a session: objection, if any, to be made in writing to the Secretary of the Council, previous to the Association taking any action on the proposition. Near the close of the same, or at a subsequent session, the Association may, by vote, invite such person to become a member, after which his membership shall be completed by his signing the Constitution and By-Laws, and paying the annual contribution for the current year.

ARTICLE III. Every member shall pay in advance to the Treasurer the sum of *Five Dollars* as his yearly contribution, and is liable to lose his membership by neglecting to pay said contribution for *three successive years.*

ARTICLE IV. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of $75 during the first year of his connection therewith, or after five years $70, or after ten years $60, or after fifteen years $50, or after twenty years $40, or after twenty-five years $30, or after thirty years $20, or after thirty-five years $10, shall become a life member, and shall be exempt from all future annual contributions.

ARTICLE V. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials should be sent to the Permanent Secretary *at least two weeks* in advance of the annual meeting.

ARTICLE VI. Members shall be entitled, on the payment of *Five Dollars*, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, Permanent Secretary, and Treasurer.

ARTICLE VII. Persons constitutionally elected to membership become permanent members, and their membership can cease only by resignation, non-payment of dues, or by expulsion, as provided in these By-Laws.

ARTICLE VIII. Resignations of membership shall be made in writing to the Permanent Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE IX. Any member may be expelled for improper conduct, or the violation of the Constitution, By-Laws, or Ethics, adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at some regular session.

ARTICLE X. Pharmacists, chemists, and other scientific men who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or vote at the meetings.

CHAPTER IX.

Of Meetings and Sections.

ARTICLE I. The meetings shall be held annually: Provided, that in case of failure o this, from any cause, the duty of calling the Association together shall devolve upon th President, or one of the Vice-Presidents, with the advice and consent of the Council.

ARTICLE II. To expedite and render more efficient the work of the Association, three Sections shall be formed, as follows: 1. Section on Scientific Papers; 2. Section on Commercial Interests; 3. Section on Pharmaceutical Legislation and Education.

ARTICLE III. The business of the Association shall be arranged so that the labors of each Section shall be considered only at the session or sessions to which they are especially assigned.

ARTICLE IV. The first, second and last sessions of the annual meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read its minutes, act on the report of Council on membership, and receive propositions for amendments to the By-Laws.

ARTICLE V. At the third session the business of the Section on Commercial Interests shall be considered.

ARTICLE VI. The fourth, fifth and sixth sessions shall be devoted to the reading of Scientific Papers and the discussions thereof.

ARTICLE VII. At the seventh, eighth and ninth sessions the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

ARTICLE VIII. A Chairman and Secretary shall be elected by ballot by each Section to serve at the special meetings of said Section. And the minutes of each meeting, together with all documents and papers which belong to each Section, must be placed as soon as possible in the hands of the Permanent Secretary for publication or safe-keeping.

ARTICLE IX. The Chairman of each Section shall preside at each of its meetings, and shall prepare a short address treating upon the subjects connected with his Section, to be read before the Section at the next annual meeting.

ARTICLE X. There shall be elected by each Section a Committee, of which the Chairman of the Section shall be Chairman, to whom shall be delegated the duty of arranging in advance the business to come before the Section at the next annual meeting; these committees in each case becoming Standing Committees of the Association.

ARTICLE XI. The order of business at the first session of each annual meeting shall be as follows:

Section 1. Promptly at the time named in the notice issued for the meeting, the President, or in his absence one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

Section 2. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the Permanent Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates.

Section 5. Reports of Committees shall be presented, read by their titles, the synopsis or in full, and laid on the table for future consideration.

Section 6. The President shall call the roll of States represented, requesting each State in turn to appoint two members, the persons so selected to act as a Committee to nominate officers for the Association and members of the Council for the ensuing year; in addition to which he shall appoint five members to act with the Committee.

Section 7. The minutes of the Council shall be read in full at the annual meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present; or, if disapproved by a majority of the members present, their acts shall be revised, so as to be acceptable to the Association.

Section 8. A committee of five on time and place of meeting shall be appointed by the President at the first session, they to report at the second session.

Section 9. Incidental business.

ARTICLE XII. The order of business at the second session at each annual meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding session, which may be amended, if necessary, and shall then be approved.

Section 3. The Report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the officers nominated shall be balloted for.

Section 4. The Council shall present names recommended for membership.

Section 5. Reports of Standing Committees shall be read.

Section 6. Reports of Special Committees shall be read.

Section 7. Incidental business.

ARTICLE XIII. The order of business for the meetings of the Section shall be determined by each Section for itself.

ARTICLE XIV. No money shall be appropriated from the Treasury by any of the Sections.

ARTICLE XV. At the last session of the Association the newly elected officers of the Association shall take their respective places.

CHAPTER X.

Of Rules of Order and Debate.

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the meeting, and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order in which they are arranged. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

CHAPTER XI.

Miscellaneous.

ARTICLE I. In all such points of order as are not noticed in these By-Laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

ARTICLE II. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at any subsequent session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

ARTICLE III. No one or more of these By-Laws shall be suspended.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

Article I. The Officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, who shall be elected by ballot by the Council, to serve one year.

Article II. They shall be elected and shall assume the duties of their respective offices immediately after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

Article I. The Chairman shall preside at all meetings of the Council; in his absence or on account of inability from any cause, the Vice-Chairman, or, in the absence of both, a Chairman *pro tempore*, shall perform the duties of Chairman.

Article II. The Chairman of the Council shall confer with the Chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

Article I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council. He shall receive an annual salary of $50.

Article II. He shall post in a conspicuous place in the meeting-room the names of the applicants for membership.

Article III. He shall read all the papers handed him by the Chairman for that purpose; shall call and record the yeas and nays whenever they are required to be called; he shall notify the Chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting.

CHAPTER IV.

Committee on Membership.

Article I. The Committee on Membership shall consist of five members of the Council, to be elected annually by ballot. The Permanent Secretary and the Treasurer of the Association shall be *ex-officio* members of this committee. The committee shall elect their chairman immediately after their election by the Council.

ARTICLE II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present the list of applicants for membership who have complied with the requirements of the By-Laws of the Association, to the Council.

ARTICLE III. They shall furnish appropriate obituary notices of deceased members for publication in the Proceedings.

ARTICLE IV. The Secretary of the Committee shall receive an annual salary of $150.

CHAPTER V.

Of Committee on Publication.

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council, who shall elect their chairman immediately after their own election by the Council.

ARTICLE II. The Committee on Publication shall have charge of the publication and distribution of the Proceedings.

CHAPTER VI.

Of Committee on Finance.

ARTICLE I. The Committee on Finance shall consist of three members. They shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VII.

Of the Centennial Fund.

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the Permanent Secretary. They shall receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount and cost of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. The Committee shall consider these applications, and at as early a date as possible shall report to the Council an outline of the proposed investigations, together with such recommendations of grants from the available funds as they may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and in case the grants be approved, the Chairman of the Council shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VIII.

Of Meetings.

ARTICLE I. The Council shall meet previous to the assembling of the Association and at such other times as they may adjourn to, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special meeting shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

ARTICLE IV. The order of business at the first session of the Council shall be as follows:

1. Organization by the election of the Chairman, Vice-Chairman, and Secretary.

2. Election of the Standing Committees of Council, as follows:

a. Committee on Membership, consisting of five members of the Council, the Permanent Secretary and Treasurer.

b. Committee on Finance, three members.

c. Committee on Publication, five members.

d. Committee on Centennial Fund, three members.

3. Unfinished and deferred business from the meeting of the last Council, or such business as is especially referred to the Council from the Association.

4. The reading of the names of new members as provided in the By-Laws.

5. Reading of reports and appointment of committees.

6. New business.

7. Adjournment—and before the final adjournment, the minutes of the last session shall be read and approved.

CHAPTER IX.

Miscellaneous.

ARTICLE I. Three members of any of the Standing Committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its Committees, and which can be disposed of by a positive or negative vote, the Chairman of the Council, or the Chairman of the Committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present. The ayes and nays of such votes taken by the Council shall be entered upon the minutes.

ARTICLE III. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be ballotted for at the next session of the Council, when upon receiving the votes of three-fourths of the members present, it shall become a part of these By-Laws.

SECTION ON COMMERCIAL INTERESTS.

ORDER OF BUSINESS.

1. Calling the Section to order.
2. Reading of the Chairman's Address.
3. Reports of Committees.
4. Reading of Papers.
5. New Business and Discussion.
6. Nomination and Election of Officers for the ensuing year.
7. Installation of Officers.
8. Reading of the Minutes.
9. Adjournment.

SECTION ON SCIENTIFIC PAPERS.

ORDER OF BUSINESS.

First Session of the Section.

1. Calling the Section to order.
2. Reading of the Chairman's address.
3. Reports of Committees, if there be any to make, and appointment of such new Committees as may appear desirable.
4. Nominations (but not elections at this sitting) for the new officers of the Section. The names of members nominated to be posted in the hall on the adjournment of this session. The election not to take place until after the opening of the next session, when further nominations may also be made if it is deemed desirable.
5. Reading of Papers and discussions on the subjects brought up.
6. Adjournment.

Second Session of the Section.

1. Reading of Minutes of the previous Session.
2. Election of New Officers for the ensuing year.
3. Reports of Committees—Incidental Business.
4. Reading of Papers and Discussion.
5. Adjournment.

Third Session of the Section.

1. Reading of Minutes of the previous Session.
2. Reports of Committees—Incidental Business.
3. Reading of Papers and Discussion.
4. Adjournment.

FOURTH SESSION OF THE SECTION.

1. Reading of Minutes of the previous Session.
2. Reading of Papers and Discussion.
3. Reports of Committees.
4. Installation of Officers.
5. New Business.
6. Reading of Minutes.
7. Final Adjournment.

SECTION ON EDUCATION AND LEGISLATION.

ORDER OF BUSINESS.

FIRST SESSION OF THE SECTION.

1. Calling the Section to Order.
2. Reading of the Address of the Chairman.
3. Reports of Committees.
4. Nominations of Officers for the ensuing year. The election to take place at the opening of the second session.
5. Reading of Papers and Discussion.
6. Adjournment.

SECOND SESSION OF THE SECTION.

1. The Reading of Minutes of the previous Session.
2. The Election of Officers.
3. Reports of Committees—Incidental Business.
4. Reading of Papers and Discussion.
5. Adjournment.

THIRD SESSION OF THE SECTION.

1. The Reading of Minutes of the previous Session.
2. Reading of Papers and Discussion.
3. Reports of Committees.
4. Installation of Officers.
5. New Business.
6. Reading of Minutes.
7. Final Adjournment.

GENERAL RULES OF FINANCE.

ADOPTED 1883, AMENDED 1885, 1887, 1888.

First, The Treasurer shall deposit all moneys received by him, except those belonging to the various "Funds," with some reliable banking company, where said money may be drawing interest for the benefit of the Association, said banking company to be designated by the Finance Committee, and approved by the Council.

Second, Said money shall be deposited in the name of the American Pharmaceutical Association, and all checks shall be drawn by the Treasurer, and shall be countersigned by the Chairman of the Council.

Third, All bills due by the Association shall be paid by numbered checks on said banking company, the checks, when returned to the Treasurer, to be attached to the several vouchers.

Fourth, The Treasurer shall make a deposit in the bank whenever the money in his hands shall amount to fifty dollars.

Fifth, The Chairman of the Council shall be the custodian of the bonds and saving bank-books, representing the several Funds belonging to the Association; and bonds and bank-books shall be in the name of the Treasurer, and the accounts of the same shall be kept by him; duplicate accounts to be kept by the Chairman of the Council, who shall make an annual report of the same to the Association.

Sixth, There shall be annually appointed, by the Council, an Auditing Committee, this Committee to consist of three members residing in or near the same city or town, the Chairman to be a member of the Finance Committee.

Seventh, The Treasurer shall balance his books July 1st of each year, and shall make out, previous to the fifteenth day of July following, his annual report for the financial year just closed.

Eighth, The Treasurer having thus balanced his books and made out his report, shall forward all his books, accounts, vouchers, etc., with the report, to the Chairman of the Auditing Committee, at such time and place in July of each year as said Chairman may direct.

The Chairman of the Council shall forward to the Chairman of the Auditing Committee, at the same time and place, the bonds, saving-bank books, and accounts of the same that may be in his hands.

Ninth, Said books, accounts, vouchers, etc., shall be returned to the Treasurer, and said bonds, savings-bank books and accounts of the same to the Chairman of the Council, all within two weeks of the date of their reception by the Chairman of the Auditing Committee.

Tenth, There shall be a meeting of the Auditing Committee in July of each year, and it shall be the duty of said Committee, at such meeting, to carefully examine all the books, accounts, vouchers, funds, etc., etc., received by them: and previous to the 1st day of August following, to make a report thereon, in writing, to the Chairman of the Council.

Eleventh, The expense of the bond of the Treasurer, given by a Trust Company, shall be paid for from the Treasury.

Twelfth, The Treasurer shall furnish with his annual report an alphabetical list of the names of the members from whom he has received money for dues and certificates during the financial year, for publication in the Proceedings.

FORM OF APPLICATION FOR MEMBERSHIP.

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them. I also enclose the annual contribution, five dollars, for the first year of my membership.

Name in full. ....

Number and Street. ....

Town and State..

Recommended by the undersigned two members in good standing:

....

....

FORMS OF PROPOSITIONS AND OF COMPLETING MEMBERSHIP IN ACCORDANCE WITH CHAPTER VIII., ARTICLE II. OF THE BY-LAWS.

THE undersigned members in good standing, being personally acquainted with the following persons eligible to membership in accordance with Chapter VIII., Article I. of the By-Laws, testify to their moral character, their skill as practical druggists and pharmacists, and their professional probity and good standing, and they recommend them for membership in the American Pharmaceutical Association.

NAMES OF CANDIDATES. ADDRESS.

Proposed by..

....

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them, and enclose the annual contribution, five dollars, for the current year.

Name in full..

Date ....

Address..

....

To be sent to Geo. W. Kennedy, Secretary of the Committee on Membership Am. Ph. Assoc., Pottsville, Penn.

ROLL OF MEMBERS.

HONORARY MEMBERS.

FOREIGN COUNTRIES.

AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

BELGIUM.

A. T. De Meyer, *Brussels*, 1868.

Norbert Gille, *Brussels*, 1868.

ENGLAND.

Dr. John Attfield, *London*, 1871.
Michael Carteighe, *London*, 1882.
Thomas Greenish, *London*, 1882.
Joseph Ince, *London*, 1882.
Richard Reynolds, *Leeds*, 1882.
Geo. F. Schacht, *Clifton*, *Bristol*, 1882.

FRANCE.

Dr. G. Planchon, *Paris*, 1877.

GERMANY.

Dr. Hermann Hager, *Pulvermühle bei Fürstenberg*, 1868.
Dr. Carl Schacht, *Berlin*, 1882.
Dr. Edward Schaer, *Strassburg*, 1877.

NETHERLANDS.

Dr. J. E. De Vrij, *Hague*, 1871.

RUSSIA.

Dr. G. Dragendorff, *Dorpat*, 1868.

J. von Martenson, *St. Petersburg*, 1882.

ACTIVE MEMBERS.

Members are requested to report any inaccuracies in these lists, and to notify the Secretary and Treasurer of all changes of address.

(The names of Life Members in SMALL CAPS. Names of Life Members under the old Constitution in *italics*.)

UNITED STATES OF AMERICA.

ALABAMA.

Mobile.

Bauer, David Samuel	1894
Brown, Albert Edward	1887
Candidus, Philip Charles	1857
McAfee, John James	1890
Mohr, Charles	1871
Mohr, Charles A.	1894
Moore, Thomas Furgeson	1894
Ortmann, John Henry	1894
Punch, William Francis	1874
Smith, Thomas Edmond	1894
Tucker, Mosely Fleming	1888
Van Antwerp, Andrew	1890
Van Antwerp, Garet	1880

Montgomery.

Knabe, Gustavus Alexander	1876

Selma.

Galt, Edward Pegram	1883

ARIZONA.

Fort Bowie.

Fouqué, Joseph	1893

Phœnix, Maricopa Co.

Eschman, Clemens Louis	1889
Furl, Irwin William	1894

Prescott.

Brisley, Harry	1894

Tempe.

Hudson, Taliaferro Flournoy	1894

ARKANSAS.

Batesville.

Fletcher, John Wade	1894

Camden.

Morgan, Aylmer Lee	1890

Fort Smith.

Morton, John Walker	1894
Sparks, James Mitchell	1894

Hot Springs.

Carr, Will Laforce	1894
Klein, Ernest Frederick	1894

Kingsland.

Anderson, Finis Logan	1892

Little Rock.

Bond, John Barnitz	1883
Dowdy, Joseph Franklin, Jr.	1894
Gibson, James Edwin	1887
Jungkind, John August	1887

Morrillton.

Dashiell, Robert Moore	1894

Pine Bluff.

Anderson, James McPhuter	1893
Dewoody, William Lawrence	1887
Hart, Gilbreath Neill	1893
Valliant, George Enos	1891

Pocahontas.

Skinner, William Henry	1894

Russellville.

Kerr, William Whitman	1887

Searcy.

Robertson, Felix Otey 1890

Van Buren.

Kerr, Frank Gault 1890

CALIFORNIA.

Alameda, Alameda Co.

Elbe, Constantine Berthold 1877

Bakersfield, Kern Co.

Drury, John Stimson 1889

Centreville, Alameda Co.

Lernhart, August 1889

Eureka, Humboldt Bay.

Powell, Robert Baldwin 1880

Fruit Vale, Alameda Co.

Neppach, Stephen Alfred 1889

Haywards, Alameda Co.

Hassler, Alfred Jacob 1891

Los Angeles.

Apel, Frederick Edmond 1892
Kirkland, Derwentwater 1889
Rives, Edward B. 1889

Marysville, Yuba Co.

Flint, John Henry 1889

Monterey.

Hilby, Francis Martin 1886

Oakland.

Flint, George Benjamin 1889
Melvin, Samuel Houston 1889
Myers, George Welton 1894
Smith, William Clay 1889

Oroville, Butte Co.

Cummins, J. Wirt 1891
Ekman, Nils Adolf 1889
Green, Robert Moore 1889

Pasadena.

Bley, Alphonso Albert Willetts 1889

Sacramento.

Helke, William Ludwig 1889
Ray, Frederick Edwards 1889

San Francisco.

Argenti, Jerome John Baptiste 1893
Bayly, Charles Alfred 1889
Calvert, John 1870
Dawson, John Henry 1882
Devine, John 1887
Grossman, Edward Lorenzo 1893
Hunt, Denis Denvin 1889
Joy, Edwin Wolcott 1882
Keil, Frederick Charles Christian 1889
Moffit, Thomas Sebatier 1861
Runyon, Edward Wheelock 1875
Schmidt, Valentine 1887
Searby, William Martin 1882
Seifert, Charles Albert 1893
Steele, James Gurden 1859
Troppmann, Charles Martin 1893
Weihe, Otto Albert 1893
Wenzell, William Theodore 1870
White, Richard Edward 1889

Santa Barbara, Santa Barbara Co.

Gutierrez, Antonio Gabriel 1889

Santa Clara.

Oberdeener, Samuel 1889

Santa Cruz.

Fay, Hamilton 1889

Vacaville.

Miller, James Monroe 1889

Vallejo, Solano Co.

Topley, James 1869

COLORADO.

Aspen.

Long, Jonathan C. 1892

Central City.

Best, John 1866
Davies, Llewellyn Powell 1891

Chandler.

Harris, Chester C. 1892
Harris, William Stillwell 1893

Colorado Springs.

Ward, Augustus Jae 1893

Denver.

Beitenman, William Wallace 1888
Black, John Reid 1891
Ford, Charles Mangan 1887
Kline, Charles Sol. 1891

Kochan, John	1888
Lord, Frank Jotham	1889
Scholtz, Edmund Louis	1881
Stebbins, Harry Frank	1891
Steinhauer, Frederick	1881
Walbrach, Arthur	1881

Fort Collins.

Scott, Alexander Wear	1893

Glenwood Springs, Garfield Co.

Ewing, Frederic Charles	1889

Longmont.

Turrell, Judson Wade	1893

Lyons.

Crona, Sixtus Edward Seine	1885

Pueblo.

Wells, Charles Horton	1893

South Denver.

Soetje, Edward Conrad	1888
Thurber, Almon Russell	1880

COLUMBIA, DISTRICT OF.

Washington.

Boyd, George Washington	1883
Christiani, Charles	1874
Coblentz, Joseph Daniel	1894
Criswell, Francis McClure	1892
Duckett, Walter G.	1876
Easterday, Herbert Clifton	1893
Halleck, William Edward	1890
Henry, Frank Clinton	1894
Hilton, Samuel Louis	1890
Hutton, Harry Dubant	1891
Johnston, Henry Augustus	1883
Lockhart, George Bradfield	1883
Major, John Richards	1873
Martin, John Charles	1883
McComas, Percy Grant	1892
Milburn, John Alexander	1858
Nattans, Arthur	1883
Read, Albert M.	1894
Schafhirt, Adolph Julian	1876
Simms, Giles Green Craycroft	1860
Thompson, William Scott	1871
Wehrly, Thomas McAleer	1883

CONNECTICUT.

Ansonia.

Smith, Samuel Wheeler	1889

Birmingham.

Hogan, John Joseph	1890

Bridgeport.

Fisher, Elbert Ellsworth	1892
Travis, J. Walton	1888

Hartford.

Chapin, Frederick Hastings	1880
Edwards, Frederick Bulkeley	1894
Goodwin, Lester Henry	1875
Newton, Philo Woodhouse	1892
Rapelye, Charles Andrew	1876
Shannon, Thomas Ross Alvin	1892
Stoughton, Dwight George	1890
Tracy, David Wallace	1892
Williams, John Kirby	1875

Litchfield.

Gates, Howard Eugene	1873

Meriden.

Mosher, William Wooster	1894

Middletown.

Pitt, John Richard	1872

Naugatuck.

May, James Oscar	1875

New Britain.

Perkins, Charles William	1892

New Canaan.

Winters, John Henry	1888

New Haven.

Dimock, Robert Hemphill	1889
Eagny, James Thomas	1894
Gessner, Emil Adolph	1878
Spalding, Warren Alphonso	1876
Sperry, Herman Jay	1880
Wood, Alonzo Felton, Jr.	1890
Wood, James Prior	1890

New London.

Huntington, William Hunter	1891
Nichols, John Cutter	1886

Noank, New London Co.

Miner, Orrin Eugene	1894

Norwich.

Duggan, James	1894
Osgood, Hugh Henry	1875
Sevin, Nathan Douglas	1875

Putnam.

Dresser, George Edward	1886

Stamford.

Haight, William Bogardus	1872

Thomaston.

Williams, Charles Fish	1888

Thompsonville, Hartford Co.

Smith, Edward Newton	1885
Steele, George Robert	1892

Versailles, New London Co.

Ridgway, Lemuel Augustus	1882

Waterbury.

Munson, Luzerne Ithiel	1872
Wilcox, Frederick	1878
Woodruff, Roderick Samuel	1876

West Winsted.

Phelps, Dwight	1873

Willimantic.

Wilson, Frank Milton	1883

DELAWARE.

Wilmington.

Belt, James Ferris	1892
Belt, Zedekiah James	1876
Harvey, John Marsh	1890
Smith, Frank Roop	1890
Smith, Linton	1870
Watson, Herbert Kennedy	1888

FLORIDA.

Apopka, Orange Co.

Kent, Robert Restieaux	1855

De Land.

Fisher, George Washington	1893

Fort George.

Rollin, John Francis	1859

Jacksonville.

Aird, William	1887
Crum, John Darius	1892
Dell, William Amos	1890
Lightstone, William Henry	1891
Martinez, Robert John	1893

Key West.

De Armona, Joseph Raymond	1893
Plummer, Joseph Wellesley Verneuil Rouchefoucauldt	1892

Myers, Lee Co.

Williams, Edward Marshall	1892

Ocala.

Delouest, Edward	1890

Pensacola.

Cushman, Henry Clay	1887

St. Augustine.

Smith, Lauriston Stephen	1892
Woodman, Walter Irving	1893

Tallahassee.

Schrader, Herman von Roden	1891

Tampa.

Leonardi, Sydney Beauregard	1890

Titusville, Brevard Co.

Dixon, John Marion	1894

GEORGIA.

Americus.

Murray, Emmett Leroy	1894

Atlanta.

Avary, Moody Burt	1892
Cartledge, Edward Cornelius	1893
Cronheim, Solomon	1892
Dunwody, Richard Gaillard	1891
Freeman, William Benjamin	1894
Jacobs, Joseph	1894
Kelly, Gilliam Geter	1894
Payne, George F.	1893
Sharp, Harry	1890
Tyner, Charles Orlando	1892
Watson, Sidney Powell	1887
Watson, William Simpson	1892

Augusta.

Durban, Sebastian Charles	1883
LAND, ROBERT HENRY	1859
Smith, James Perrin	1894

Columbus.

Turner, John Persons	1894
Wheat, Eli Marby	1892

Dalton.

Herring, Herbert Lee	1893

Darien.

Cornell, Russell Wilbur	1893

Greenville.

Tigner, James Ogletree.	1890

Jackson.

Wagner, William Ignatius	1892

La Grange.

Slack, Henry Richmond, Jr.	1890

Macon.

Brunner, Norman Isaac.	1878
Cheatham, Thomas Alexander	1890
Ingalls, John	1876

Marietta.

Crosby, Charles Mayo	1893

Milledgeville.

Case, George Daniel	1891

Montezuma.

Walker, Joel Preston	1893

Palmeito.

Peniston, Paul	1893

Rome.

Curry, David W.	1894

Savannah.

Rowlinski, Robert Antone	1892
Solomons, Isaiah Abram	1894

Summerville.

Arrington, Homer Houston	1892

Thomasville.

Bondurant, Charles Scott	1888
Thomas, Robert, Jr.	1888

IDAHO.

Caldwell.

Smithson, David Elmer	1890

Murray, Shoshone Co.

Ingalls, Albert Orfila	1885

ILLINOIS.

Arcola, Douglas Co.

Boyd, William Porter	1892

Aurora.

Staudt, Louis Carl	1890

Bloomington.

Green, Hamer Herschel	1892

Bradford, Stark Co.

Plummer, David Gorham	1869

Cairo.

Schuh, Paul Gustav	1894

Camp Point, Adams Co.

Bartells, George Case	1881

Carlinville, Macoupin Co.

Loehr, Theodore Christian	1888

Chicago.

Bartlett, Nicholas Gray	1864
Behrens, Emil Christian Louis	1893
Behrens, Paul Johannes Heinrich	1888
Bell, John Irving	1890
BIROTH, HENRY	1865
Bishop, Samuel Edward	1890
Bodemann, Wilhelm	1887
Bronson, George Styles	1893
Button, Charles Edwin	1881
Conrad, John	1887
Dorner, Emil August	1892
Eaton, John McCoy	1892
EBERT, ALBERT ETHELBERT	1864
Feldkamp, Charles Louis	1893
Fischer, Oscar Frederick	1892
Fleischer, Adolph Theodore	1888
Forsyth, William Kitchin	1892
Frerkson, Richard Christopher	1888
FULLER, OLIVER FRANKLIN	1869
Gale, Edwin Oscar	1857
Gale, William Henry	1857
Grassly, Charles William	1884
Gray, William	1892
Hallberg, Carl Swante Nicanor	1879
Hartwig, Charles Ferdinand	1881
Hartwig, Otto Julius	1892
Heddens, Claus Heising	1893
Hereth, Samuel Franklin	1893
Hogan, Louis Cass	1890
Hogey, Julius Henry	1880
Houghton, Harry James	1891
Jamieson, Thomas Nevin	1888
Kadlec, Lawrence Wesley	1880
Kirchgasser, William Charles	1888
Klein, Frederick	1893

Knudsen, Rudolph Hans	1892
Leenheer, Bastian	1891
Lord, Thomas	1882
Lundberg, John Christian	1892
Matthews, Charles Edwards	1893
Miner, Maurice Ashbel	1880
Morland, Robert Lawson	1892
Oglesby, George Daniel	1891
Oldberg, Oscar	1873
Parsons, John	1865
Patterson, Theodore Henry	1869
Pattison, George Henry	1893
Porter, Millett Nathan	1892
Puckner, William August	1888
Rhode, Rudolph Ernst	1887
Sargent, Ezekiel Herbert	1864
Scherer, Andrew	1884
Schmidt, Florian Charles	1882
Schmidt, Frederick Michael	1887
Schwab, Leslie Watts	1892
Scott, J. McDonald	1892
Sempill, Walter Morrison	1892
Smith, Benjamin Franklin	1892
Tanke, Julius Ernst Ferdinand	1893
Truax, Charles	1882
Voge, Richard	1893
Wheeler, Charles Gilbert	1892
WHITFIELD, THOMAS	1865
WOLTERSDORF, LOUIS	1865
Wooten, Thomas Victor	1893
Zahn, Emil Augustus	1881

East St. Louis.

Knoebel, Thomas	1892

El Paso, Woodford Co.

Strathman, Charles August	1888

Grand Crossing.

Pattison, Charles Henry	1891

Highland.

Mueller Adolphus	1871

La Salle.

Adamick, Gustave Hattenhauer	1891

Lincoln.

Reed, Charles Cornean	1892

Moline.

Sohrbeck, George Henry	1888

Momence.

Culver, Anson Allen	1890

Pekin.

Ehrlicher, Henry Michael	1892

Peoria.

Benton, Wilber Merritt	1888
Lueder, Fritz	1894
Zimmerman, Albert	1893
Zimmerman, Charles	1881

Peru, La Salle Co.

Hattenhauer, Robert Christopher	1881

Rockford.

Sawyer, Willey Warren	1893

Rock Island.

Wyckoff, Elmer Ellsworth	1894

Saybrook.

Travis, Miles Beaty	1889

Streator.

Higby, William Herbert	1892

Stronghurst, Henderson Co.

Harter, Isaac Foster	1893

INDIAN TERRITORY.

Eufaula.

Moore, Charles Gates	1892

Wagoner.

Beardsley, Joseph Laurence	1892

Wynnewood.

Hillebert, George Allen	1894

INDIANA.

Bourbon.

Weiser, William Augustus	1894

Columbus.

Stahlhuth, Ernst Henry William	1887

Edinburg.

Moffett, Thomas James	1893

Evansville.

Schlaepfer, Henry John	1879

Fairmount.

Beasley, William Alexander	1894
Edwards, Nathan Wilson	1879

Garrett.

Stoehr, Julius John	1894

Indianapolis.

Carter, Frank Hahneman	1891
Dill, John Byron	1878
Eberhardt, Ernest Godlove	1887
Eichrodt, Charles William	1892
Field, Claud	1890
Frauer, Herman Emanuel	1881
Huder, Henry J	1894
Hurty, John Newell	1882
Leist, Jacob Lawrence	1881
Lilly, Eli	1878
Lilly, Josiah Kirby	1890
Pfafflin, Henry Adolph	1892
Shake, Homer C	1892
Sloan, George White	1857
Zimmer, Harry Edgar	1892

Jeffersonville.

Loomis, John Clarence	1876

La Porte.

Meissner, Frederick William, Jr	1890

New Albany.

Henry, Charles Landon	1893
Knoefel, Charles Deitrick	1894

Rockport, Spencer Co.

Anderson, Charles Burnett	1891

Seymour.

Andrews, Josiah Harding	1879

South Bend.

Eliel, Leo	1882

Terre Haute.

Baur, Jacob	1879
Prentiss, John Brookes	1894

Warren.

Hickerson, William Henry	1894

IOWA.

Cascade, Dubuque Co.

Weber, John Henry	1893

Chariton, Lucas Co.

Yocum, Albert Lee	1892

Clinton.

Majer, Oscar	1880

Colesburg.

Dittmer, Charles Lot	1892

Davenport.

Ballard, John Winthrop	1871
Harrison, Jacob Hugh	1883

Des Moines.

Judisch, George	1890
Kaiser, William O	1893
Macy, Sherman Riley	1891
McMichael, Americus Ojeda	1892

Dubuque.

Hervey, James	1892
Ruete, Theodore William	1870
Torbert, Willard Horatio	1887

Fort Dodge.

Oleson, Olaf Martin	1877

Fort Madison.

Schafer, George Henry	1871

Iowa City.

Boerner, Emil Louis	1877

Keokuk.

Kiedaisch, John Frederick, Jr	1893

Marshalltown.

Upson, Rosa	1887

Monticello.

Tiarks, Hermann	1876

Muscatine.

Braunwarth, Alice Louisa	1892
Krehe, John Theodor	1884

Oskaloosa.

Pickett, John Harvey	1887

Prairie City.

Johnson, Frank Wyatt	1892

Sioux City.

Arnold, Charles Frederick	1891
Crady, Edward Edmond	1892
Moore, Silas Harwood	1880
More, Arthur James	1881
Scherling, Gustav	1884

Stuart.

Treat, Joseph Augustus	1885

Waterloo.

Wangler, Conrad David	1876

KANSAS.

Atchison.

Noll, Mathias	1891

Galena.

Enterkine, James Edward	1892

Gypsum City, Saline Co.

Schmitter, Jonathan	1892

Hiawatha.

Miner, Mary Olds	1892

Lawrence.

Boyce, Samuel Robert	1894
Leis, George	1869
Moore, John Thomas	1888
Raymond, Harry Legate	1891
Sayre, Lucius Elmer	1883

Leavenworth.

Brown, Robert J	1862
Mehl, Henry William	1892

Liberal, Seward Co.

Smith, George Sylvester	1892

Marion.

Young, Hiram W	1894

Ottawa.

Becker, Charles Louis	1892

Peabody.

Roberts, Daniel John	1881

Perry, Jefferson Co.

Spangler, Henry William	1888

Salina.

Seitz, Oscar	1881

Topeka.

Merrell, Ashbel Hill	1884
Washburn, Harry Monroe	1890

Wichita.

Hettinger, Howard Huyett	1894

KENTUCKY.

Carrollton.

Geier, Oscar William	1880

Covington.

Auf'mwasser, Hugo William	1892
Auf'mwasser, Julius Hermann	1893
Morwessel, Henry	1893
Pieck, Edward Ludwig	1887
Zwick, George Albert	1874

Flemingsburg.

Reynolds, John Jefferson	1876

Frankfort.

Averill, William Henry	1874
Gayle, John William	1891

Henderson.

Radford, Reuben Lee	1893
McFarland, Robert Mumford	1893

Louisville.

Beckmann, Oscar Albert	1879
Colgan, John	1867
Constantine, Edward Richard	1891
Diehl, Conrad Lewis	1863
Dilly, Oscar Charles	1888
Fischer, Phil.	1883
Fowler, Joseph William	1890
Jones, Simon Newton	1870
Kessler, Edward Frederick	1879
Mueller, Otto Edward	1888
Newman, George Abner	1866
Overstreet, William Payne	1893
Peter, Minor Cary	1894
Peyton, Robert Docker	1887
Pfingst, Ferdinand John	1867
Rademaker, Hermann Henry	1879
Renz, Frederick Jacob	1883
Rogers, Wiley	1874
Scheffer, Emil	1872
Schiemann, Edward Bernard	1880
Schoettlin, Albert John	1882
Snyder, Robert Johnson	1887

Newport.

Holzhauer, Gustavus	1893

Shelbyville.

Preissler, Henry Webber	1893

Somerset.

Porter, Chilton Scott	1882

Uniontown.

Hardigg, William Leopold	1881

LOUISIANA.

Baton Rouge.

Boisvert, Pierre	1891

Bayou Goula.

Viallon, Paul Louis 1870

Bayou Sara.

Kilbourne, Lewis Perkins 1891

Bonnet Carré.

Donaldson, Pierre Armand 1891

Franklin.

Frere, Alexander Gabriel 1882

Houma.

Fraisse, Louis Americus 1891

Minden.

Goodwill 1891

New Iberia.

Lee, Charles Hill 1891
Lee, James Augustin 1856

New Orleans.

Albrecht, Joseph 1891
Bogel, William George Henry 1891
Brand, Erich 1888
Breslin, Michael Thomas 1891
Chalin, Louis Fisk 1887
Dejan, John Baptist George 1891
Finlay, Alexander Kirkwood 1883
Girling, Robert Nash 1891
Godbold, Fabius Chapman 1887
Grambois, Augustin 1891
Graner, Albert 1891
Graner, William 1891
Hall, Charles Knap 1887
Helmann, Otto 1891
Hubert, Ernest 1891
Keppler, Charles Lewis 1891
Keppler, Christian Lewis 1882
Lalmant, Eugene 1891
Lavigne, Jean Baptist 1891
Legendre, Joseph Amilcar 1891
Levy, William Michael 1894
Lyons, Isaac Luria 1875
Mattingly, George James 1891
May, Eugene 1891
Metz, Abraham Lewis 1887
Otto, John Nicholas Washington 1891
Robin, Oscar 1887
Rudolf, Mrs. Eliza 1887
Siekman, Ivan Francis 1891
Stendel, Julius Guthardt 1891
Taylor, Walter Thomas 1891
Tuma, Bruno Ottokar Camillo 1891
Wunderlich, Edward 1891

Plaquemine.

Hiriart, Sebastian 1891

Port Allen.

Charroppin, Emile Lafond 1891

MAINE.

Auburn.

Robinson, William Allen 1892

Augusta.

Partridge, Charles Kimball 1867

Bangor.

Harlow, Noah Sparhawk 1859
Sweet, Caldwell 1881

Bath.

Anderson, Samuel 1876

Belfast.

Moody, Richard Henry 1876

Biddeford.

Boynton, Herschel 1875

Danforth, Washington Co.

Porter, Martin Luther 1892

Ellsworth.

Parcher, George Asa 1875

Lewiston.

Moulton, Daniel Pierce 1891
Wakefield, Seth David 1892

Machias.

Crane, Frank Trussel 1894

Pittsfield.

Libby, Henry Fitzgerald 1882

Portland.

Earl, Noble Clarkson 1894
Frye, George Carlton 1879
Hay, Edward Allston 1889
Hay, Henry Homer 1867
Perkins, Benjamin Abbott 1878

South Windham.

Rand, Daniel Moulton 1892

MARYLAND.

Baltimore.

Baxley, Jackson Brown	1856
Brack, Charles Emil	1876
Burrough, Horace	1883
Caspari, Charles, Jr.	1883
Culbreth, David Marvel Reynolds	1883
Davis, John Alexander	1894
Dohme, Alfred Robert Louis	1891
Dohme, Charles Emile	1863
Dohme, Louis	1859
Elliott, Henry Alexander	1859
Emich, Columbus Valentine	1863
Foster, James Webb	1894
Frames, John Fuller	1890
Gilpin, Henry Brooke	1889
Gosman, Adam John	1870
Habliston, Charles Carroll	1894
Hancock, John Francis	1863
Hancock, John Henry	1870
Hynson, Henry Parr	1890
Jennings, Nathaniel Hynson	1857
Lauer, Michael John	1865
Muth, George Louis	1894
Quandt, Arthur Albert	1894
Quandt, Ernest Edmond	1894
Russell, Eugene James	1856
Schulze, Louis	1892
Sharp, Alpheus Phineas	1855
Simon, William	1885
Smith, Theodric	1890
Thomsen, John Jacob	1883
Westcott, James Walling	1890
WINKELMANN, JOHN HENRY	1864

Chestertown.

Stam, Colin Ferguson	1882

Cumberland.

Herman, John George	1878
Shriver, Henry	1876
Shryer, Thomas Wilson	1875

Frederick City.

Schley, Steiner	1878

Hagerstown.

WINTER, JONAS	1863

MASSACHUSETTS.

Amesbury.

Dufault, Hilaire	1892
Trudel, Jacques Joseph	1892

Andover.

Parker, George Hawkins	1874

Boston.

Baird, Julian William	1894
Baker, Frederick Warren Kidder	1892
Bartlet, William Williams	1875
Bassett, Charles Harrison	1867
Boyden, Edward Cleveland	1874
Burnham, Alfred Augustus, Jr.	1891
CANNING, HENRY	1865
Capper, William Ernest	1892
Carrol, Edward	1892
Chapin, William Arms	1880
Colton, James Byers	1865
Copeland, Sidney Fred	1892
Cramer, Max	1881
CUTLER, EDWARD WALDO	1859
Doliber, Thomas	1859
DRURY, LINUS DANA	1871
Dunham, Henry Bristol	1892
Durkee, William Carley	1885
Gammon, Irving Parker	1891
Godding, John Granville	1875
Gorman, John Thomas Bernard	1892
Hayes, James Henry	1892
Jenkins, Luther Lincoln	1867
Jones, James Taber	1875
Kelley, Edward Samuel	1871
Leavitt, Miner La Harpe	1890
Lewis, Ernest Grant	1892
Lowd, John Colby	1871
Markoe, George Frederick Holmes	1863
McColgan, Adam Thomas	1892
Mowry, Albert Daniel	1884
Patch, Edgar Leonard	1872
Patten, Ichabod Bartlett	1858
Phillimore, Frederick George	1894
Pierce, William Herbert	1879
Prescott, Horace Augustus	1875
Sawyer, William Frederick	1885
Scoville, Wilbur Lincoln	1891
Sharples, Stephen Paschell	1875
SHEPPARD, SAMUEL AIRUS DARLINGTON	1865
Siegemund, Charles Augustus	1882
Sleuman, Charles Andrew, Jr.	1892
Smith, Linville Holton	1892
Squires, George Brenton	1891
Stowell, Daniel	1875
Sumner, Alphonso	1892
Tilden, Amos Kendall	1892
Tucker, Greenleaf Robinson	1890

Vargas-Heredia, Jorge..............1891
Varney, Edward Francis............1892
Wells, Edwin Herbert..............1893
West, Charles Alfred...............1892
Wheeler, William Dexter............1892
Williams, George Gorham...........1888
Wilson, Benjamin Osgood...........1859

Brockton.

Randall, Frank Otis.................1893

Brookfield.

Hobbs, William.....................1892

Cambridge.

Phillips, Carrie Elizabeth............1894
Wood, Edward Stickney.............1879

Cambridgeport.

BAYLEY, AUGUSTUS RAMSEY........1859
La Pierre, Elie Henry...............1892
Laing, Alfred Allan.................1888
ORNE, JOEL STONE.................1859
Porter, Louis Fowler...............1892

Charlestown.

Marshall, Ernest Clifton.............1875
Stacey, Benjamin Franklin...........1860

Chelsea.

Buck, John.........................1855
Buck, John Lynian..................1883

Concord.

Richardson, Horatio Stillman........1892

Dover.

Colcord, Samuel Marshall.........1852

East Weymouth.

Hoyt, George Melvin...............1875

Fall River.

Riddell, Benjamin Franklin..........1892

Fitchburg

Estabrook, Henry Arthur............1886

Great Barrington.

Whiting, Frederick Theodore........1863

Haydenville.

Cone, Alfred George................1892

Holyoke.

Ball, Charles Ely...................1885

Benhard, Albert Henry.............1894
Fortier, Lawrence Hubert...........1892

Lawrence.

Glover, William Henry..............1891
Walker, Charles Wilkes.............1892
WHITNEY, HENRY MARTIN..........1859

Lee.

Pease, Francis Merrick..............1880

Lexington.

Perham, Henry Albert...............1892

Lowell.

Bailey, Frederick...................1869
Butler, Freeman Hall................1874
Hood, Charles Ira...................1871
Robinson, Edward Augustus.........1888
Thomasson, Anders.................1892

Malden.

Sargent, Jesse Warren..............1892

Marlborough.

Hartshorn, Frederick Arthur.........1880

Methuen.

Taylor, George Arthur...............1892

New Bedford.

Blake, James Edwin.................1866
Bunker, Elihu......................1885
Hadley, Frank Rufus................1872
Lawton, Charles Henry..............1873
Lawton, Horace Allen...............1873
Shurtleff, Israel Hammond..........1875
Taylor, John Pitman.................1875

Newburyport.

Goodwin, William W...............1853
Homer, John.......................1887

Newton.

Crowdle, John Edward..............1894
Hudson, Arthur.....................1882
Mason, Harry Ruggles..............1894

North Andover.

Berrian, George Washington........1857

North Weymouth.

Turner, Thomas Larkin............1853

Orange.

Fish, Frederick Willis...............1892

Peabody.

Grosvenor, Daniel Prescott..........1881

Pittsfield.

Burghardt, George Henry...........1892
Fahey, Edward Francis.............1892
Farrell, Thomas Henry.............1892
Hydren, Carl......................1892
Manning, John Henry...............1889
Murphy, John Joseph...............1892

Plymouth.

Carver, Frank Hahnemann.........1891

Provincetown.

Adams, John Darrow................1892

Quincy.

Whall, Joseph Stokes..............1873

Rockland.

Estes, Joseph Joslyn..............1870

Rockport.

Blatchford, Eben..................1857

Salem.

Nichols, Thomas Boyden............1876
Price, Charles Henry..............1882
Price, Joseph.....................1888

Shelburne Falls.

Baker, Edwin......................1875

Somerville.

Cowdin, George Henry..............1875
Flanagan, Lewis Cass..............1875
Howland, Edgar Joseph.............1892

South Framingham.

Bridges, Charles Herbert..........1892

Stoneham.

Drake, Frederick Townsley.........1894
Ward, Charles Abraham.............1891

Wellesley.

Tailby, Joseph Allen..............1892

West Acton.

Hutchins, Isaiah..................1880

West Newton.

Wright, Albert Francis............1892

Woburn.

Brooks, Frederic Pratt............1891
French, John I....................1894

Worcester.

Hale, Chester Stanley.............1892
Harris, Francis Mason.............1894
Scott, George Theodore............1883
Williams, Duane Burnett...........1881

MICHIGAN.

Ann Arbor.

Brown, Henry Jefferson............1882
Eberbach, Ottmar..................1869
Mann, Albert......................1889
Prescott, Albert Benjamin.........1871
Schlotterbeck, Julius Otto........1888
Stevens, Alonzo Burdette..........1885

Armada, Macombe Co.

Phillips, Edwin Freeman...........1888

Benton Harbor.

Bird, Harry L.....................1891

Coopersville, Ottawa Co.

Gillett, John.....................1892

Corunna.

Reidy, Michael....................1894

Detroit.

Baier, Charles George.............1887
Bassett, Arthur...................1888
Breningstall, Reuben Grant........1891
Caldwell, James William...........1875
Dupont, William...................1887
Gidday, Frederic Camdy............1893
Helfman, Joseph...................1894
Inglis, Frank.....................1887
Johnston, William, Jr.............1888
McFarland, Andrew.................1891
Parker, Arthur Sheldon............1891
Perry, Frederick William Riley....1885
Sherrard, Charles Cornell.........1893
Stearns, Henry Albyn..............1888
Stevens, Fred. D..................1888
Stewart, Francis Edward...........1894
Thompson, Frank Augustus..........1888
Vernor, James.....................1866
Warren, William Matthew...........1889

East Saginaw.

Prall, Delbert Elwyn..............1876

Gould City.

Summers, James Wilbur Fisk........1893

Grand Rapids.

Russell, Dorian Melancthon Russell .. 1894

Greenville.

Hall, William Alanson 1888

Ionia.

Gundrum, George 1882

Kalamazoo.

McDonald, George 1871
Todd, Albert May 1885

Manistee.

Lyman, Asahel Hubert 1884

Muskegon.

Brundage, Fred 1888
Jesson, Jacob 1872

Owasso.

Parkhill, Stanley E. 1887

Red Jacket, Houghton Co.

McDonald, Daniel Turner 1884

St. Clair City.

Ward, George James 1893

MINNESOTA.

Brainerd.

Percy, William Gil 1892

Duluth.

Boyce, Samuel F. 1871
Sweeney, Robert Ormsby 1866

Fergus Falls.

Harding, Lawrence Arthur 1892

Grove City.

Gayner, John Niles 1890

Lake Park.

Heyerdahl, Carl Otto 1893

Minneapolis.

Crolius, Frank Marcelous 1884
Donaldson, Joseph Coddington 1893
Huhn, George 1884
Sanderson, Stephen Francis 1880
Wulling, Frederick John 1893

Rochester.

Qvale, Victor Asbgörn 1889

St. Paul.

Frost, William Arthur 1892
King, George Alexander Newton 1892
Simmon, Karl 1880
Warren, Edwin Alonzo 1887

Wabasha.

Trautmann, Ludwig 1893

Waterville.

Rohde, Claus Frederick 1885

MISSISSIPPI.

Aberdeen, Monroe Co.

Eckford, Joseph William 1883

Gloster, Amite Co.

Schotel, John Charles 1891

Jackson.

Ash, Matthew Franklin 1856

Meridian.

Lillybeck, Oscar 1891
Moore, Joshua Forrest 1891
White, William Henry 1891

Natchez.

Means, John Coalter 1891

Port Gibson.

Shreve, John Alexander 1880

Scranton.

Cox, William Augustus 1894

MISSOURI.

Boonville.

Mittelbach, William 1891
Wooldridge, Daniel Turley 1890

Carrollton.

PETIT, HENRY McEWEN 1860

Freeman.

Dolan, Frank Linley 1888

Independence.

Wight, Oscar Martin 1887

Jackson.

Woods, Silas Elliot 1893

Jefferson City.

Brandenberger, Adolph 1894

Kansas City.

Eyssell, George....................1889
Ford, William Thomas..............1878
Hamilton, Claude Craig.............1893
Hess, Paul Ludwig.................1892
Lahme, Charles Adolph 1881
Walker, David 1894
Willett, Gerald Howard 1892

Kirkwood.

Hemm, Louis Phillips...............1894
Mueller, Ambrose...................1894

Lebanon.

Farrar, Samuel Richard.............1891

Marcelin, Linn Co.

Shelton, William Armstrong.........1891

Marshall.

Franklin, Philip Henry 1881

Mexico, Audrain Co.

LLEWELLYN, JOHN FREDERICK 1867

Mine La Motte.

Houser, Charles Gustavus...........1893

Moberly, Randolph Co.

Last, Louis Christopher August......1888

Old Orchard, St. Louis Co.

Geiger, Charles Frederick...........1894

Orrick, Ray Co.

McLean, George 1894

Pierce City, Lawrence Co.

Armstrong, George Revington.......1877

Rich Hill.

Young, William 1883

Sedalia.

Fleischmann, Augustus Theodore 1885

St. Joseph.

Demond, Otto John................1892

St. Louis.

Ahlbrandt, Henry Ernst 1877
Alexander, Maurice William.........1871
Blank, Alois......................1881
Boehm, Solomon 1871
Braun, Adolf Phillips Carl 1894
Curtman, Charles Otto..............1871
Frost, Louis Eugene 1891
Good, James Michener 1871
Grandjean, Charles.................1871
Grandjean, Eugene 1871
Hassebrock, Henry Fred 1884
Hemm, Francis.....................1881
Hoenny, Adolph John..............1890
James, Frank Lowber 1888
Klie, George Henry Charles.........1878
Layton, Thomas....................1892
Leitch, Arthur 1860
Loelkes, Alexander George..........1891
Mallinckrodt, Edward..............1869
Meyer, Christian Fred. Gottlieb......1860
Morley, William Jarman............1876
Pauley, Frank Charles..............1879
Physick, Henry Sanford 1870
SANDER, ENNO.....................1858
Scheffer, Henry William............1863
Schurk, Louis......................1890
Sennewald, Ferdinand William 1865
Sippy, Alvin Hiram................1890
Sohn, Frank 1888
Stark, Harry......................1893
Tomfohrde, Charles William 1890
Uhlich, Ferdinand Gottlieb..........1881
Vordick, August Henry.............1874
Wall, Otto Augustus 1884
Westmann, Frank Henry 1882
Whelpley, Henry Milton............1887
Whitcomb, Frederick Ezekiel........1888
Wilson, Charles Frederick 1891
Wurmb, Theodore Henry...........1890

Stewartsville, De Kalb Co.

Weber, Hermann August 1893

Weston.

Parr, John Conrad................1856

NEBRASKA.

Beatrice.

Shultz, Merriken Emory 1893

Fairbury.

Pease, Autumn Vine 1893

Fairfield.

Riggs, William Edward.............1892

Grand Island, Hall Co.

Buchheit, Augustus William.........1893

Lincoln.

Daubach, Charles Joseph 1889

Nebraska City.

Reed, James 1893

Omaha.

Kuhn, Norman Archibald 1878
Sherman, Charles Rollin 1889
Snow, Herbert Waldemar 1887

Wahoo.

St. Martin, Theophilus 1893

NEVADA.

Gold Hill.

Jones, John, Jr 1889

Virginia City.

Perkins, William Alexander 1869

Winnemucca.

Brown, William Ambrose 1893

NEW HAMPSHIRE.

Derry Depot.

Bell, Samuel Howard 1890

Dover.

McFarland, George Francis 1892
TUFTS, CHARLES AUGUSTUS 1856

Exeter.

Wetherell, Albert Sumner 1892

Great Falls.

Hurd, John Charles 1892

Greenville.

Hall, Charles Edwin 1884

Hanover.

Downing, Lucien Bliss 1892

Keene.

Hodgkins, Bert Willis 1888

Lebanon.

Wilder, George Patterson 1892

Littleton.

Bowker, Everett Forrest 1892
Kenney, Herbert Eastman 1890
Robins, Wilbur Fiske 1892

Manchester.

Baril, Joseph Benjamin 1892
Currier, Edward Hervey 1892
Miville, Francis Charles 1877
Way, Frank Lester 1893

Marlborough.

Emerson, Hermann Lincoln 1892

Nashua.

Morse, Charles Milan 1888
Whitman, Nelson Samuel 1875

New Market.

Dearborn, George Luther 1853

Portsmouth.

Green, Benjamin 1888
Preston, Andrew Peabody 1881

Somersworth.

Moore, George 1859

NEW JERSEY.

Asbury Park.

Woolley, Stephen Disbrow 1888

Bayonne.

Alpers, William Charles 1890

Beverley.

Dougherty, Samuel Edward 1875

Bloomfield.

Scherff, John Philip 1877
Wood, George Mervin 1890

Bordentown.

Carslake, George Middleton 1880

Bridgeton.

Dare, Charles Ford 1889
Davis, Theodore Garrison 1890

Camden.

Beringer, George Mahlon 1893

East Orange.

Davis, George Randolph 1883
Williams, Seward Whiting 1887

Elizabeth.

Frohwein, Richard 1867
Kent, Henry Avery, Jr. 1880
Oliver, William Murray 1875

Englewood.

Rockefeller, Lucius	1880

Freehold.

Walker, John Putnam	1881

Hoboken.

KLUSSMANN, HERMANN	1876

Jersey City.

Abernethy, Maxwell	1865
Ewing, John	1893
Foulke, James	1881
Gallagher, John Charles	1893
Hartnett, Eugene	1893
Lyons, Fred. Wyckoft	1893
Vockroth, Emil	1893
White, George Henderson	1868
Wienges, Conrad	1875

Keyport.

Warn, William Edgar	1886

Madison.

Brown, William Thompson	1894

Matawan, Monmouth Co.

Slater, Frank Hovey	1882

Medford.

Thorn, Henry Prickett	1879

Morristown.

Carrell, Eugene Ayers	1875

Mt. Holly.

Jones, Edward Burrough	1894
WHITE, AARON SMITH	1860

Newark.

Betzler, Jacob	1880
Bruguier, Francis	1876
HOLZHAUER, CHARLES	1873
Mennen, Gerhard	1888
Sayre, William Henry	1877
Smith, Charles Bradley	1868
Smith, Clarence Pennington	1890
Staebler, Richard Elimar Johannes	1892
Stamford, William Harrison	1876
Van Winkle, Abraham	1871
Wright, Arthur Wellington	1894

New Brunswick.

Kilmer, Frederick Barnett	1886
Rust, William	1870

Passaic.

Power, Frederick Belding	1872

Perth Amboy.

Parisen, George Warren	1892

Plainfield.

Miller, Joseph Gilbert	1886
Ollif, James Henry	1867
Reynolds, Howard Prescott	1875
Shaw, Robert Johnston	1875

Somerville.

Cook, Gilbert Snowden	1886
Field, James Clinton	1894

South Amboy.

JACQUES, GEORGE WASHINGTON	1869

NEW MEXICO.

Deming, Grant Co.

Kinnear, James Aloysius	1891

Eddy, Eddy Co.

Myhre, Olaus Gustav	1892

Kingston, Sierra Co.

Nowers, Lawrence Edward	1892

NEW YORK.

Albany.

Gaus, Charles Henry	1879
Gaus, Louis Henry	1880
Gibson, Charles	1880
Huested, Alfred Birch	1879
Michaelis, Gustavus	1882
Sautter, Louis	1879
Turner, George Heather	1880
Walker, William John	1880

Auburn.

Stanley, Edgar Clarke	1880

Binghamton.

Cox, John Thomas	1892
Loveland, Charles Hungerford	1892
Otis, Clark Zelotes	1886

Brooklyn.

Aspinall, Walter Albert	1880
Bartley, Elias Hudson	1893
Brooks, George Washington	1879
Brundage, Albert Harrison	1892
Colen, James Austin	1892

Cutts, Foxwell Curtiss, Jr.	1875
Davis, William Mortimer	1879
DeForest, William Pendleton	1879
Dennin, Charles	1875
Dennin, Edwin Clinton	1892
Douglass, Henry, Jr.	1875
Dunn, John Augustus	1867
Eccles, Robert Gibson	1885
FOUGERA, EDMUND CHARLES HENRY	1890
Haviland, Henry	1857
Krieger, Philip	1876
Lehn, Louis	1874
Levy, Adolph	1877
Livingston, Barent Van Buren	1872
McElhenie, Thomas Diamond	1872
Newman, George Anthony	1865
Owens, Richard John	1860
Pfeiffer, John	1893
Ray, Peter William	1892
Schimpf, Henry William	1894
Snyder, Ambrose Chancellor	1867
Squibb, Edward Hamilton	1882
Squibb, Edward Robinson	1858
Werner, Rudolf Carl	1892
Zellhoefer, George	1876

Buffalo.

Chase, Walter Herbert	1892
Gregory, Willis George	1886
Hayes, Horace Phillips	1880
Mayer, John Frederick	1892
Peabody, William Huntington	1857
Rano, Charles Orlando	1866

Catskill.

Du Bois, William Laneman	1880

Corning.

Cole, Victor Le Roy	1890

Croton-on-Hudson.

Henry, Charles (Dworniczak)	1881

Dunkirk.

Davis, Eugene Miller	1892

Elmira.

Holmes, Clay Wood	1873

Fishkill-on-Hudson.

Moith, Augustus Theodore	1860

Flushing.

Hepburn, John	1873
James, William Tefft	1882

Geneseo, Livingston Co.

Rogers, Arthur Henry	1882

Gloversville, Fulton Co.

Miller, Jason Albert	1879
Van Auken, Jerrie A.	1880

Holley, Orleans Co.

Bishop, Francis Myron	1882

Jamaica, Queens Co.

Baylis, Lewis Fosdick	1880
Goodale, Harvey Galusha	1879
Peck, George Lyman	1883

Jamestown.

Winnberg, John Magnus	1892

Kingston.

Dedrick, William Frederick	1884

Middletown.

KING, JAMES THEODORE	1859
Rogers, William Henry	1869

Mount Vernon.

Gill, George	1872

Newburgh.

Chapman, Isaac Close	1887
Tartiss, Alfred Joseph	1867

New York City.

Amend, Bernard Gottwald	1892
Amend, Otto Paul	1892
Atwood, Herman White	1873
Balser, Gustavus	1875
Beardmore, William Arthur	1890
Bendiner, Samuel Julius	1882
Billings, Henry Merry	1869
Blackman, Augustus Smith	1893
Chandler, Charles Frederic	1867
Christie, James	1893
Coblentz, Virgil	1882
Cook, Thomas Penrose	1877
Ditman, Andrew Jackson	1868
Ebbitt, William Henry	1889
Eimer, Charles	1872
Elliott, Arthur Henry	1892
Fairchild, Benjamin Thomas	1875
Fairchild, Samuel William	1887
Fink, Frederick William	1886
Ford, Herbert Lord	1890
Fraser, Horatio Nelson	1888
Gardner, Robert Winslow	1867

Geisler, Joseph Frank	1889
GRIFFITH, ALBERT RICHARD	1870
Hauenstein, William	1883
Haynes, David Oliphant	1887
Hays, Benjamin Franklin	1886
Hays, David	1867
Hegeman, Johnson Niven	1880
Heydenreich, Emile	1867
Higgins, James Starkey	1862
Hoffmann, Frederick	1867
Hudnut, Alexander	1857
Hynard, Eugene Robert	1892
Ihlefeld, Conrad Heinrich	1881
Jones, James Henry	1892
Jungmann, Julius	1879
Kalish, Julius	1875
Keenan, Thomas John	1894
Kemp, Edward	1888
Kennedy, Ezra Joseph	1887
Koles, Samuel Morse	1890
Kraemer, Henry	1892
Lampa, Robert Raymond	1892
Leonhard, Rudolph Ernest	1891
Lovis, Henry Christian	1892
Macmahan, Thomas Jackson	1871
Main, Thomas Francis	1872
Martin, Robert Rowlett	1892
Mason, Alfred Henry	1884
Massey, William Morton	1885
Mayo, Caswell Armstrong	1893
McIntyre, Byron Floyd	1876
McIntyre, Ewen	1873
McKesson, George Clinton	1888
McKesson, John, Jr.	1867
MILHAU, EDWARD LEON	1858
Molwitz, Ernest	1867
O'Neil, Henry Maurice	1879
Osmun, Charles Alvin	1868
Plaut, Albert	1894
Pleasants, Charles Henry	1890
Plummer, Edward	1889
Pyle, Cyrus	1859
Quackinbush, Benjamin Franklin	1886
Ramsperger, Gustavus	1860
Rice, Charles	1870
Rusby, Henry Hurd	1890
Sayre, Edward Augustus	1877
Schieffelin, William Jay	1892
Schmid, Henry	1887
Schmidt, Ferdinand Traugott	1886
SEABURY, GEORGE JOHN	1876
Sieker, Ferdinand August	1893
Skelly, James Joseph	1866
Smith, Reuben Randolph	1890
Stoff, Louis Ferdinand	1892
Tscheppe, Adolph	1876
Weinman, Oscar Christian	1873
Wichelns, Frederick	1881
Wickham, William Hull	1870
Wilson, William	1876

Olean.

Coon, James Van Deventer	1880
Rich, Willis Simmons	1882

Oswego.

Butler, Charles Henry	1887

Plattsburgh.

Hitchcock, John E.	1892

Port Chester.

Hyler, William Henry	1875

Port Henry.

Smith, Edward Salvister	1890

Potsdam.

Thatcher, Hervey Dexter	1865

Poughkeepsie.

Odell, Willis B.	1893

Richfield Springs.

Smith, Willard Alfred	1880

Rochester.

Paine, James Dixon	1857
Schmitt, Joseph Max	1882
Smith, Jay Hungerford	1883

Rome.

Owens, James Alanson	1882

Saratoga Springs.

Fish, Charles Frederick	1866

Syracuse.

Dawson, Edward Seymour, Jr.	1876
Snow, Charles Wesley	1876
Webber, J. Le Roy	1886

Tonowanda, Erie Co.

Scoville, Charles Henry	1882

Troy.

Pennington, Thomas Henry Sands	1877

Utica.

Blaikie, William 1879
Cone, John Wright 1876
Maine, August 1892

Wellsville, Allegheny Co.

Hall, Edwin Bradford...............1879

Yonkers.

Eschman, Frederick William Rudolph . 1880
Petsche, Franz Fred. Bismark Wilhelm. 1892
Wray, George Brown 1888

NORTH CAROLINA.

Asheville.

Smith, Whitefoord Gamewell........1892

Charlotte.

Wearn, William Henry.............1888

Concord.

Fetzer, Nevin Dieffenbacher.........1894
Johnson, Daniel Dudley 1894

Durham, Orange Co.

Vaughan, Parry Wyche.............1882
Yearby, William Morgan............1894

Fayetteville.

Horne, Henry Ruffin... 1891
Sedberry, Bond English 1882

Franklin, Macon Co.

Smith, Frank Taylor 1894

Greensboro.

Mebane, Robert Sloan..............1894

Henderson.

Parker, Walter Wellington 1894

Hickory.

Royster, Olim Marcus 1894

Littleton.

Parrott, John Evans.................1890

Maxton.

Croom, James Dallas................1890

Oxford.

Hancock, Franklin Willis...........1888

Plymouth.

Chears, Henry Randolph 1893

Raleigh.

Bobbitt, James Henry..............1894
Bradley, Augustus 1894
Hunter, Buxton Williams 1891
Simpson, William 1873

Tarboro.

Zoeller, Edward Victor 1878

Wadesboro.

Hardison, James Archibald..........1894

Washington.

Gallagher, Charles Kewell 1857

Waynesville.

Way, David........................1894

Wilmington.

Hardin, John Haywood 1881

Wilson.

Hargrave, Benjamin Worthington....1894

NORTH DAKOTA.

Grafton.

Haussamen, Henry Louis...........1888

OHIO.

Akron.

Smith, Joseph Stahle. 1878

Berea, Cuyahoga Co.

Noble, William Wesley.............1893

Brooklyn Village.

Schmidt, Carl 1891

Bryan.

Snyder, Alva Leach................1873

Caldwell.

Bowron, Walter Henry. 1890

Cheviot.

Hildreth, Newton Gough 1879

Chillicothe.

Howson, Arthur Bayshawe..........1886
Nipgen, John Alvin 1879

Cincinnati.

Betz, Otto Edward..................1887
De Lang, Alfred 1887
Eger, George.......................1864

Eichberg, Julius Henry	1893
Fennel, Charles Theodore Piderit	1886
Fieber, Gustavus Adolphus	1893
Gordon, William John Maclester	1854
Greve, Theodore Lund August	1864
Greyer, Julius	1880
Heineman, Otto	1864
Hoffman, Julius	1887
Klayer, Louis	1884
Koehnken, Herman Henry	1875
Lehnkering, Charles Frederick	1893
Lloyd, John Uri	1870
Meininger, Albert	1881
Merrell, Charles George	1888
Merrell, George	1879
Phillips, Charles Wilson	1881
Ruppert, John	1880
Sauer, Louis Wendlin	1882
Serodina, Herman	1880
Simonson, William	1887
Vilter, Hermann Theodore	1881
Wagner, Henry	1876
Weeks, Benjamin Franklin	1891
Wetterstroem, Albert Frederick Charles	1888
YORKSTON, MATTHEW MACKAY	1864
Zuenkeler, John Ferdinand	1887

Cleveland.

Acker, Philip	1889
Asplin, John Harding	1882
Aubley, Samuel	1888
Bartlett, John Augustus	1893
Bechberger, Henry	1893
Benfield, Charles William	1893
Biddle, Herbert George	1888
Bruce, James	1882
Cobb, Ralph Lathrop	1883
Deutsch, Julius William	1888
Dreher, Louis	1881
Elliott, Sidney Thomas	1893
Feil, Joseph	1885
Fischer, Henry John	1888
Flood, William Henry	1892
Gegelein, Frederick Leonhardt	1881
Gleim, John Christopher	1893
Glines, George Walter	1881
Haake, William Henry	1893
Hannan, Owen Burdette	1893
Hechler, George Louis	1882
Hopp, Lewis Christopher	1876
Kiefer, George	1890
Krebs, Carl Julius	1893
Kuder, William Frank	1893
Lane, Edward Baxter	1893
Lehr, Philip	1885
May, Arthur Ferdinand	1851
Meyer, William Victor	1893
Myers, Daniel	1882
Probeck, George Joseph	1893
Rosewater, Nathan	1880
Schellentrager, Ernst August	1882
Schoenhut, Christian Henry	1888
Scott, Frank Genio	1891
Selzer, Eugene Reinhold	1893
Sherwood, Henry Jackson	1894
Sords, Thomas Vincent	1893
Spenzer, Peter Ignatius	1872
Urban, Jacob Philip	1881
Voss, George William	1885

Columbiana.

Ink, Charles Elliott	1885

Columbus.

Bruck, Philip Henry	1884
Byrne, John	1894
Hatton, Edgar Melville	1878
Hatton, Ellmore Wright	1894
Herbst, Frederick William	1882
Huston, Charles	1872
Karb, George James	1883
Kauffman, George Beecher	1882
Rauschkolb, John	1894
Schueller, Ernst	1881
Schueller, Frederick William	1880
Sherwood, Louis Walker	1882

Conneaut, Ashtabula Co.

Simons, Arthur Henry	1892

Dayton.

Burkhardt, Mark Anthony	1887
Kurfurst, Henry Ferdinand	1881
Spengler, John George	1887

Delaware.

Pfiffner, Fritz John R.	1894

East Liverpool, Colorado Co.

Albright, Emmet Cyrus	1894

Findlay.

Firmin, John Curtis	1893

Glendale, Hamilton Co.

Feemster, Joseph Hall	1873

Grand Rapids, Wood Co.

Thurston, Azor	1886

Ironton.

Sample, Elmer Winters.	1894
Winters, Aaron	1894

Jefferson, Ashtabula Co.

Case, Charles Henry	1892

Lima.

Melville, William Milne	1893

Logan.

Harrington, Frank	1869

Massillon, Stark Co.

Baltzly, Zachariah Taylor	1876
Kirchhofer, Peter Paul	1881

Middletown.

Johnson, Charles Brayton.	1876

Navarre.

Grossklaus, John Ferdinand	1859

Norwood, Hamilton Co.

Weyer, John	1887

Salem, Columbiana Co.

Hawkins, Michael Smith	1870

Scio.

Beal, James Hartley	1892

Springfield.

Casper, Thomas Jefferson	1867
Lisle, Justin Dickson	1894
Siegenthaler, Harvey N.	1882

Toledo.

Hohly, Charles	1872

Troy.

Tobey, Charles William	1879

Wooster.

Ohliger, Lewis Philip	1871

OKLAHOMA TERRITORY.

El Reno.

Sombart, John Edward	1881

Guthrie.

Hanenkratt, Diebold Victor.	1894

OREGON.

Ashland.

Sherwin, Eugene Alonzo	1889

Portland.

Blumauer, Louis	1889
Clarke, Louis Gaylord	1889
Dietrick, Howard Dickson	1889
Pfunder, William	1889

The Dalles.

Blakeley, George Clarence	1892

PENNSYLVANIA.

Allegheny City.

Armor, Alpheus	1882
Eggers, Frederick Hermann	1872
Slocum, Frank Leroy	1880

Beaver, Beaver Co.

Andriessen, Hugo	1875

Bethlehem.

Metzger, George Franklin	1893

Bristol.

Pursell, Howard	1880
Young, John Kroesen	1887

Carlisle.

Horn, Wilbur Fisk	1876

Chambersburg.

Crawford, Walter Beatty, Jr.	1891
Keefer, Charles DeWalt	1891

Connellsville.

Berryhill, Henry Pennick	1890

Franklin.

Rieseman, Joseph	1883

Harrisburg.

George, Charles Theodore	1873
Gorgas, George Albert	1884
Gross, Edward Ziegler	1883
Miller, Jacob Augustus	1873

Lancaster.

HEINITSH, CHARLES AUGUSTUS	1857
Heinitsh, Sigmund William	1889

Lebanon.

LEMBERGER, JOSEPH LYON	1858
Redsecker, Jacob Henry	1881

Linesville.

Allen, E. Floyd	1885

Lock Haven.

Prieson, Adolph	1880

Media, Delaware Co.

JONES, EDWARD CHARLES	1864

Minersville.

Burns, John Kellar	1876

Mt. Pleasant, Westmoreland Co.

McElwee, Emer Judson	1888

Norristown.

Reed, Willoughby Henry	1893
Stahler, William	1880

Orwigsburg, Schuylkill Co.

Binkley, George K.	1892

Philadelphia.

Apple, Franklin Muhlenberg	1893
Bauer, Louis Gustavus	1867
Blair, Henry Cowen	1868
Borell, Henry Augustus	1874
BORING, EDWIN MCCURDY	1867
Bower, Henry	1860
Boyden, Henry D.	1893
Bullock, Charles	1857
Burg, John Dellinger	1888
Cuthbert, Richard W.	1893
Dobbins, Edwards Tompkins	1867
Eberle, Charles Louis	1865
Eddy, Henry Clay	1869
Ellis, Evan Tyson	1857
England, Joseph Winters	1893
Fox, Peter Paul	1869
French, Harry Banks	1890
Früh, Carl Daniel Stephan	1876
Gano, William Hubbell	1892
Gerhard, Samuel	1873
Grahame, Israel Janney	1856
Haenchen, Charles Eugene	1865
Hance, Edward Hance	1857
Hancock, Charles West	1868
Hanson, Arthur Edward	1888
Hassinger, Samuel Ellphat Reed	1880
Heintzelman, Joseph Augustus	1858
Holland, George	1894
Hunter, Henry Blount	1894
Jenks, William Jenks	1858
Jones, Alexander Henry	1874
Kebler, Lyman Frederic	1894
Keeney, Caleb Reynolds	1868
Kline, Mahlon Norwood	1878
Koch, Louis	1872
Krewson, William Egbert	1875
Lehnkering, Charles Frederick	1893
Maisch, Henry Charles Christian	1885
Marshall, Rush Porter	1893
McIntyre, William	1868
Mellor, Alfred	1864
Miller, Adolph William	1868
Milligan, Decatur	1867
Moore, Joachim Bonaparte	1860
Morris, Lemuel Iorwerth	1880
Newbold, Thomas Mitchell	1876
Ogden, John	1890
Ottinger, James Jeremiah	1876
Peacock, Josiah Comegys	1892
Perot, Thomas Morris	1857
Pile, Gustavus	1881
Potts, David Gardiner	1893
Preston, David	1868
Procter, Wallace	1874
REMINGTON, JOSEPH PRICE	1867
Richter, Gustave Adolph	1890
Riley, Charles William	1868
Rittenhouse, Henry Norman	1857
Robbins, Alonzo	1865
ROSENGARTEN, MITCHELL GEORGE	1869
Ryan, Frank Gibbs	1892
Sadtler, Samuel Philip	1893
Shafer, Erwin Clement	1893
Shinn, James Thornton	1860
Shoemaker, Richard Martin	1869
Stedem, Frederick Will. Edward	1892
Taylor, Alfred Bower	1852
Thompson, William Beatty	1858
Trimble, Henry	1876
Warner, William Richard	1857
Webb, William Henry	1867
Weidemann, Charles Alexander	1868
Wendel, Henry Edward	1873
Wiegand, Thomas Snowdon	1857
ZEILIN, JOHN HENRY	1850

Pittsburgh.

Beach, Clifton Hilliard	1883
Emanuel, Louis	1878
Finley, Ardon Chapman	1890
Hays, Joseph Anthony	1892
Henderson, Archibald Keys	1888
Holland, Samuel Smith	1876

Kelly, George Armstrong	1882
Koch, Julius Arnold	1892
Nisbet, William Washington	1883

Pottsville.

Deibert, Thomas Irvin	1882
Kennedy, George Washington	1869

Reading.

Stein, Jacob Henry	1869
Ziegler, Philip Milton	1867

Schuylkill Haven.

Commings, Charles Samuel	1888

Scottdale, Westmoreland Co.

McNeil, John Murray	1882

Shamokin.

Smink, Robert William	1893
Smink, William Henry R.	1885

Tarentum.

Cummings, Theodore Foster	1882

Towanda.

Porter, Henry Carroll	1880

Warren.

Dixson, Frederick Hartly	1892

West Chester.

Evans, Joseph Spragg	1877

White Haven.

Driggs, Charles M.	1881

Williamsport.

Cornell, Edward Augustus	1873
Duble, Jesse Balderston	1870
Hill, Justin Luther	1887

York.

Patton, John Franklin	1880

RHODE ISLAND.

Narragansett Pier.

Tobin, John Martin	1887

Newport.

Cole, Charles Mowry	1888
Cotton, William Henry	1885
Downing, Benjamin Franklin	1886

Providence.

Blanding, William Oliver	1894
Calder, Albert Layton	1859
Cates, William Everett	1888
Danforth, Edmund Culver	1878
Fenner, Alexander Wilson	1888
Gilbert, Charles Atwood	1891
Greene, William Ray	1883
Hardy, Cyrus Daniel.	1891
O'Hare, James	1888
Pearce, Howard Anthony	1894
Potter, William Robert.	1894
Reynolds, William Keyes	1876
Wood, Mason Bowen	1882

Westerly.

Collins, Albert Burlingame	1882

SOUTH CAROLINA.

Anderson.

Wilhite, Frank Turner	1893

Charleston.

Aimar, Charles Pons	1879
Burnham, Edward Steinmeyer	1874
Eckel, Augustus William	1874
Marsteller, George Ludwig	1883
Plenge, Henry Charles	1894

Columbia.

Thomas, Oscar Ernest	1882

SOUTH DAKOTA.

Clark, Clark Co.

Brewer, John Weems	1893

Custer City.

Taylor, Thomas Lachlin	1892

Howard.

Ayer, Charles Foster	1891

Lake Preston, Kingsbury Co.

Keith, Irwin Alonzo	1892

Romona.

Huecker, John	1891

Tyndall.

Cotton, Robert M.	1893

Wessington Springs.

Hall, Nettie Crabbe	1893

TENNESSEE.

Bristol.

Bunting, Lindsay	1890

Chattanooga.

Greve, Charles Mathias 1887
Stong, Franz Sigel 1894
Voigt, Joseph Frederick 1893

Clarksville.

Bradley, Charles Larkin 1894
Lockert, Charles Lacy 1894

Columbia.

Rains, Aris Brown 1894

Covington.

Jacocks, John Thomas 1894

Harriman.

Kline, Charles Grant 1894

Knoxville.

Gooding, Charles John 1892
Rosenthal, David Abraham 1894

Memphis.

ROBINSON, JAMES SCOTT 1869
Treherne, John Curtis 1894

Murfreesboro.

Vickers, Rufus William 1894

Nashville.

Davis, Samuel Charles 1893
Burge, James Oscar 1878
Gordon, Richard Haden 1891
Ruddiman, Edsel Alexander 1894

Tullahoma.

Conger, Iliff 1891

TEXAS.

Athens.

La Rue, William Isaac 1892

Dallas.

De Lorenzi, Albert 1890
Fetterman, Thomas Moore 1892
Keene, Thomas Rucker 1888
Klauber, Charles Nathaniel 1891
Schweickhardt, Richard 1890

Denison.

Robert, William Henry, Jr. 1892

El Paso.

Irvin, William Armstrong 1879

Ennis.

Matkin, George Garrett 1892

Fort Worth.

Harper, Harry Winston 1881
Powell, Thomas Wallace 1874

Galveston.

Orton, Ingomar Francois 1891

Granbury, Hood Co.

Morgan, Eugene Hilliard 1892

Houston.

Burgheim, Jacob 1892
Cunningham, Henrietta Manlove 1894
Ross, Samuel Price 1892

Paris.

Greiner, William Edward 1892

San Antonio.

Cohn, Richard 1892
Schmitt, George Joseph Francis 1890

Tyler.

Gee, Charlie 1893

Van Alstyne.

Neathery, James Miller 1892

UTAH.

Park City.

Brother, William 1892

Salt Lake City.

Druehl, Frank August 1889
Farlow, John Boylan 1889
Franken, James Latinnes 1892
McCoy, Clarence Herbert 1893

VERMONT.

Barre.

Kendrick, Harlan Page 1894

Brandon.

Crossman, George Alvin 1872

Brattleboro.

Chapin, Henry Allen 1892

St. Albans.

Dutcher, Alfred Luther 1892

St. Johnsbury.

Bingham, Charles Calvin 1875

VIRGINIA.

Charlottesville.

Wills, Frederick Miles..............1890

Danville.

Cole, Howson White...............1882

Falls Church.

Church, Merton Elbridge 1892

Gordonsville.

Broadus, Thomas Madison..........1890

Leesburg.

Purcell, Nicholas Sidney............1890

Martinsville.

Kearfott, Clarence Piercall 1890

Norfolk.

Hudgins, Ernest Franklin...........1893
Jackson, Edward Calvert............1883

Richmond.

Baker, Thomas Roberts 1873
Briggs, Andrew Gessner 1890
Miller, Polk 1894
Miller, Turner Ashby 1894
Scott, William Henry 1873

Roanoke.

Christian, John Fleming 1894

WASHINGTON.

Castle Rock.

Hille, David Johnson 1893

La Conner, Skagit Co.

Joergensen,Gerhard JohanCarl Sophus. 1889

Seattle.

Holmes, Henry Elliott 1880

Tacoma.

Cummings, Henry Thornton........1853

WEST VIRGINIA.

Charleston, Kanawha Co.

Boggs, Edwin Leslie 1872

Wheeling.

Bocking, Edmund 1874
Williams, William Hudson..........1880

WISCONSIN.

Eau Claire.

Blestren, Hans Markus Gunerius.....1889

Fountain City.

Bechman, Charles Richard..........1882

Janesville.

Heimstreet, Edward Burton.........1874

La Crosse.

Beyschlag, Charles 1880

Madison.

Bernhard, Charles Henry 1888
Hollister, Albert Henry.............1884
Kremers, Edward..................1887

Mayville, Dodge Co.

Sauerhering, Rudolph Aurelius 1884

Milwaukee.

Conrath, Adam....................1881
Dadd, John Alfred.................1880
Drake, John Ransom...............1860
Kienth, Hans 1884
Meissner, Paul Ernest 1888
Ruenzel, Henry Gottlieb............1892
Schrank, Charles Henry 1876

Neillsville.

Sniteman, Charles Clarence 1881

WYOMING.

Fort Russell.

Depeyre, Louis Nolël...............1894

Rawlins.

Maghee, Thomas Gillison...........1892

Sheridan.

Desmond, Edward.................1892

BERMUDA.

Hamilton.

Heyl, James Bell..1863

DOMINION OF CANADA.

NEW BRUNSWICK.

St. John.

Coupe, Robert Edward 1894

NORTHWESTERN TERRITORY.

Regina.

Ferguson, Andrew Davis.............1893

NOVA SCOTIA.

Halifax.

Simson, Francis Cook 1876
Simson, William Amore.............1894

Pictou.

Fraser, Robert Peden 1885

ONTARIO.

Hamilton.

Clark, John Alexander..............1890

Ottawa.

Saunders, William 1860

St. Thomas.

Foster, William Orrville 1881

Stratford.

Waugh, George James..............1862

Toronto.

Heebner, Charles Frederick.........1894
Lander, John Cambridge............1877
Lowden, John.......................1875
Robinson, Ernest Frankish..........1889

Windsor.

D'Avignon, John Eugene...........1888

PRINCE EDWARD ISLAND.

Charlottetown.

Dodd, Simon Walker 1884
Johnson, Arthur Sterling 1889

QUEBEC.

Montreal.

Baridon, Louis Richard 1890
Carrieré, Rodrique..................1893
Gray, Henry Robert 1867
Hedley, Thomas Albert.............1893
Lachance, Seraphin.................1888
Morland, Robert Lawson 1892
Morrison, Joseph Edward...........1888

Three Rivers.

Williams, Richard Wellington.......1883

HAWAIIAN ISLANDS.

Honolulu.

Lyons, Albert Byron...1885

MEXICO.

Botica del Leon, Monterey.

Egeling, Berthold Frederick Gustavus.....................................1893

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Arny, Harry Vin, Göttingen, Germany 1891
Martin, Nicholas Henry, Newcastle upon Tyne, England.......................1891
Wellcome, Henry Solomon, London, England..................................1875

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Bossidy, Bartholomew	1889
Brandon, Cole W	1892
Groetsch, George W.	1892
Hanson, Arthur Edward	1888
Macmillan, Andrew Jackson	1892
McConville, Thomas Aloysius	1864
McPherson, George	1865
Raynale, Frank Bertrand	1891
Reichardt, Frederick Alfred	1871
Shelton, William Camp	1891
Wardell, Robert C.	1860
Wolfe, Nathaniel	1878
Williams, Benjamin Christopher	1890

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Bradley, Chas. L.,
Franklin st., Clarksville, Tenn.
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Magazine & Jackson sts., New Orleans, La.
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Residence unknown.
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Bridges, Charles H.,
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Brisley, Harry,
Prescott, Ariz.
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Gordonsville, Va.
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Brown, Albert E.,
16 Dauphin st., Mobile, Ala.
Brown, Henry J.,
2 Main st., Ann Arbor. Mich.
Brown, Robert J.,
113 Delaware st., Leavenworth, Kan.
Brown, William A.,
Eagle Drug Store, Winnemucca, Nev.
Brown, Wm. T.,
Madison, N. J.
Bruce, James,
544 Prospect st., Cleveland, O.
Bruck, Philip H.,
961 S. High st., Columbus, O.
Bruguier, Francis,
Hamburg Place & Lafayette st., Newark, N.J.
Brundage, Albert H.,
1153 Gates ave., Brooklyn, N. Y.
Brundage, Fred.,
21 Terrace st., Muskegon, Mich.
Brunner, Norman I.,
4th & Arch sts., Macon, Ga.
Buchheit, Aug. W.,
119 W. 3d st., Grand Island, Neb.
Buck, John,
267 Broadway, Chelsea, Mass.
Buck, John L.,
267 Broadway, Chelsea, Mass.
Bullock, Charles,
528 Arch st., Philadelphia, Pa.
Bunker, Elihu,
403 Purchase st., New Bedford, Mass.

Bunting, Lindsay,
Main st., Bristol, Tenn.
Burg, John D.,
4th & Brown sts., Philadelphia, Pa.
Burge, James O.,
Broad & Market sts., Nashville, Tenn.
Burghardt, George H.,
7 North st., Pittsfield, Mass.
Burgheim, Jacob,
1019 Congress ave., Houston, Tex.
Burkhardt, Mark A.,
Third & St. Clair sts., Dayton, O.
Burnham, Alfred A., Jr.,
459 Dudley st., Boston, Mass.
Burnham, Edward S.,
369 King st., Charleston, S. C.
Burns, J. Kellar,
Sunbury & Lecona sts., Minersville, Pa.
Burrough, Horace,
405 W. Camden st., Baltimore, Md.
Butler, Charles H.,
182 W. 1st st., Oswego, N. Y.
Butler, Freeman H.,
141 Central st., Lowell, Mass.
Button, Charles E.,
744 W. Van Buren st., Chicago, Ill.
Byrne, John,
200 N. High st., Columbus, O.
Calder, Albert L.,
183 N. Main st., Providence, R. I.
Caldwell, James W.,
242 Grand River ave., Detroit, Mich.
Calvert, John,
Kearney & Clay sts., San Francisco, Cal.
Candidus, Philip C.,
Mobile, Ala.
CANNING, HENRY.
109 Green st., Boston, Mass.
Capper, William E.,
278 Dartmouth st., Boston, Mass.
Carr, Will. L..
334 Central ave., Hot Springs, Ark.
Carrell, Eugene A.,
South st., Morristown, N. J.
Carrieré, Rodrique,
1341 St. Catherine st., Montreal, Can.
Carrol, Edward,
Woolsey Sq., Jamaica Plain, Mass.
Carslake, George M.,
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Carver, Frank H.,
Main st., Plymouth, Mass.
Case, Charles H.,
Jefferson, Ashtabula co., O.
Case, George D.,
Milledgeville, Ga.
Caspari, Charles, Jr.,
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Casper, Thomas J.,
41 E. Main st., Springfield, O.
Cates, William E.,
145 Prairie ave., Providence, R. I.
Chalin, Louis F.,
Carrolton & St.Chas. aves., New Orleans, La.
Chandler, Charles F.,
4th ave. & E. 49th st., New York, N. Y.
Chapin, Fred. H.,
259 Main st., Hartford, Conn.
Chapin, Henry A.,
80 Main st., Brattleboro, Vt.
Chapin, William A.,
Beach & Lincoln sts., Boston, Mass.
Chapman, Isaac C.,
111 Water st., Newburgh, N. Y.
Charroppin, Emile L.,
Port Allen, La.
Chase, Walter H.,
306 W. Ferry st., Buffalo, N. Y.
Chears, Henry R.,
Plymouth, N. C.
Cheatham, Thomas A.,
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Clarke, Louis G.,
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Cobb, Ralph L.,
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Coblentz, Joe. Dan.,
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Coblentz, Virgil,
115 W. 68th st., New York, N. Y.
Cohn, Richard,
816 W. Commerce st., San Antonio, Tex.
Colcord, Samuel M.,
Dover, Mass.
Cole, Charles M.,
302 Thames st., Newport, R. I.
Cole, Howson W.,
429 Main st., Danville, Va.
Cole, Victor L.,
22 East Market st., Corning, N. Y.
Cohen, James A.,
383 Court st., Brooklyn, N. Y.
Colgan, John,
10th & Walnut sts., Louisville, Ky.
Collins, Albert B.,
48 Main st., Westerly, R. I.
Colton, James B.,
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Commings, Charles S.,
Main & St. Peter sts., Schuylkill Haven, Pa.
Cone, Alfred G.,
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Cone, John W.,
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Conger, Iliff,
Tullahoma, Tenn.
Conrad, John,
239 State st., Chicago, Ill.
Conrath, Adam,
630 Chestnut st., Milwaukee, Wis.
Constantine, Edward R.,
200 W. Green st., Louisville, Ky.
Cook, Gilbert S.,
Somerville, N. J.
Cook, Thomas P.,
114 William st., New York, N. Y.
Coon, James V. D.,
111 Union st., Olean, N. Y.
Copeland, Sidney F.,
392 Boylston st., Boston, Mass.
Cornell, Edward A.,
Pine & 4th sts., Williamsport, Pa.
Cornell, Russell W.,
Darien, Ga.
Cotton, Robert M.,
Tyndall, S. Dak.
Cotton, William H.,
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Momence, Ill.
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Davis, George R.,
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Davis, John A.,
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Davis, Theodore G.,
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De Lang, Alfred,
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De Lorenzi, Albert,
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Diebert, Thomas I.,
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Dohme, Charles E.,
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Dohme, Louis,
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Drake, John R.,
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Dreher, Louis,
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Druehl, Frank A.,
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Warren & Dudley sts., Boston, Mass.
Duble, Jesse B.,
Pine & 4th sts., Williamsport, Pa.
Du Bois, William L.,
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Duckett, Walter G.,
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Dufault, Hilaire,
60 Friend st., Amesbury, Mass.
Duggan, James,
50 Main st., Norwich, Conn.
Dunham, Henry B.,
12 Copeland st., Boston, Mass.
Dunn, John A.,
36 Doughty st., Brooklyn, N. Y.
Dunwody, Richard G.,
369 Piedmont ave., Atlanta, Ga.
Dupont, William,
182 Michigan ave., Detroit, Mich.
Dupuy, Eugene,
520 Hancock st., Brooklyn, N. Y.
Durban, Sebastian C.,
708 Broad st., Augusta, Ga.

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392 Boylston st., Boston, Mass.
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Earl, Noble C.,
Portland, Me.
Easterday, Herbert C.,
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Eaton, John M.,
334 Dearborn st., Chicago, Ill.
Ebbitt, William H.,
170 William st., New York, N. Y.
Eberbach, Ottmar,
12 South Main st., Ann Arbor, Mich.
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EBERT, ALBERT E.,
426 State st., Chicago, Ill.
Eccles, Robert G.,
191 Dean st., Brooklyn, N. Y.
Eckel, Augustus W.,
231 King st., Charleston, S. C.
Eckford, Joseph Wm.,
Commerce st., Aberdeen, Miss.
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18th & Lombard sts., Philadelphia, Pa.
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Edwards, Nathan W.,
Main st., Fairmount, Ind.
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Botica del Leon, Monterey, Mexico.
Eger, George,
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172 E. Ohio st., Allegheny City, Pa.
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334 Court st., Pekin, Ill.
Eichberg, Julius H.,
50 W. 9th st., Cincinnati, O.
Eichrodt, Charles W.,
503 North West st., Indianapolis, Ind.
Eimer, Charles,
130 E. 18th st., New York, N. Y.
Ekman, N. Adolf,
Oroville, Cal.
Elbe, Constantine B.,
Long Beach, Los Angeles Co., Cal.
Eliel, Leo,
101 Main st., South Bend, Ind.
Elliott, Arthur H.,
115 West 68th st., New York, N. Y.
Elliott, Henry A.,
673 W. Lexington st., Baltimore, Md.
Elliott, Sidney T.,
32 John st., Cleveland, O.
Ellis, Evan T.,
335 S. 18th st., Philadelphia, Pa.
Emanuel, Louis,
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84 Fulton st., New York, N. Y.
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Finlay, Alexander K.,
186 Camp st., New Orleans, La.

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Fisher, George W.,
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Hall, Charles K.,
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301 5th st., San Francisco, Cal.
Hunter, Buxton W.,
Fayetteville st., Raleigh, N. C.
Hunter, Henry B.,
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Hurd, John C.,
26 Market st., Great Falls, N. H.
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Johnson, Charles B.,
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Jones, Edward B.,
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JONES, EDWARD C.,
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Jones, James T.,
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Littleton, N. H.

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Park Drug Store, Elizabeth, N. J.

Kent, Robert R.,
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461 Dryades st., New Orleans, La.

Keppler, Christian L.,
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Kerr, Frank G.,
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Kerr, William W.,
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.McFarland, George F.,
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Merrell, Charles G.,
6th st. & Eggleston ave., Cincinnati, O.
Merrell, George,
6th st. & Eggleston ave., Cincinnati, O.
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2d & Chestnut sts., Harrisburg, Pa.
Miller, James M.,
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Miller, Jason A.,
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Miller, Joseph G.,
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Miller, Polk,
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Miller, Turner Ashby,
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Milligan, Decatur,
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Moffett, Thomas J.,
Edinburg, Ind.
Moffitt, Thomas S.,
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Eufaula, Indian Territory.
Moore, George,
26 Market st., Somersworth, N. H.
Moore, Joachim B.,
13th & Lombard sts., Philadelphia, Pa.
Moore, John T.,
1012 Rhode Island st., Lawrence, Kan.
Moore, Josh. F.,
4th st., Meridian, Miss.
Moore, Silas H.,
80 4th st., Sioux City, Ia.
Moore, Thos. F.,
Cor. Dauphin & Conception sts., Mobile, Ala.
More, Arthur J.,
304 Pearl st., Sioux City, Ia.
Morgan, Aylmer L.,
Washington & Adam sts., Camden, Ark.
Morgan, Eugene H.,
Granbury, Hood co., Tex.
Morland, Robert L.,
132 State st., Chicago, Ill.
Morley, William J.,
109 S. 2d st., St. Louis, Mo.
Morris, Lemuel I.,
720 N. Broad st., Philadelphia, Pa.
Morrison, Joseph E.,
33 Church st., Montreal, Can.
Morse, C. Milan,
95 Main st., Nashua, N. H.
Morton, John W.,
521 Garrison ave., Fort Smith, Ark.
Morwessel, Henry,
90 W. 6th st., Covington, Ky.
Mosher, William W.,
13 Colony st., Meriden, Conn.
Moulton, Daniel P.,
213 Lisbon st., Lewiston, Me.
Mowry, Albert D.,
365 Warren st., Boston, Mass.
Mueller, Adolph,
Cherry st., Highland, Ill.
Mueller, Ambrose,
Webster & Jefferson aves., Kirkwood, Mo.
Mueller, Otto E.,
801 E. Madison st., Louisville, Ky.
Munson, Luzerne I.,
Apothecaries' Hall, Waterbury, Conn.
Murphy, John J.,
Pittsfield, Mass.
Murray, Emmett L.,
Americus, Ga.
Muth, George L.,
15 E. Fayette st., Baltimore, Md.
Myers, Daniel,
111 Water st., Cleveland, O.
Myers, George W.,
Lakeport, Cal.
Myhre, Olaus G.,
Fox st., Eddy, Eddy co., N. Mex.
Nattans, Arthur,
2d & D sts., N. W., Washington, D. C.
Neathery, James M.,
North side Jefferson st., Van Alstyne, Tex.
Neppach, Stephen A.,
Fruit Vale, Alameda co., Cal.
Newbold, Thomas M.,
608 S. 42d st., Philadelphia, Pa.
Newman, George A.,
5th & Walnut sts., Louisviile, Ky.
Newman, George A.,
380 Myrtle ave., Brooklyn, N. Y.
Newton, Philo W.,
142 Asylum st., Hartford, Conn.
Nichols, John C.,
55 State st., New London, Conn.
Nichols, Thomas B.,
178 Essex st., Salem, Mass.
Nipgen, John A.,
Paint & 2d sts., Chillicothe, O.

Nisbet, William W.,
Washington ave., Pittsburgh, Pa.
Noble, William W.,
Berea, Cuyahoga co., O.
Noll, Matthias,
627 Commercial st.. Atchison, Kan.
Nowers, Lawrence E.,
Kingston, Sierra co., N. Mex.
O'Hare, James,
6 Benefit st., Providence, R. I.
O'Neil, Henry M.,
463 Hudson st., New York, N. Y.
Oberdeener, Samuel,
Franklin st., Santa Clara, Cal.
Odell, Willis B.,
So. Englewood, Cook co., Ill.
Ogden, John,
1233 Walnut st., Philadelphia, Pa.
Oglesby, George D.,
Lake ave. & 50th st., Chicago, Ill.
Ohliger, Lewis P.,
23 West Liberty st., Wooster, O.
Oldberg, Oscar,
2421 Dearborn st., Chicago, Ill.
Oleson, Olaf M.,
Fort Dodge, Iowa.
Oliver, William M.,
132 Broad st., Elizabeth, N. J.
Ollif, James H.,
200 Arlington ave., Plainfield, N. J.
ORNE, JOEL S.,
493 Main st., Cambridgeport, Mass.
Ortmann, John H.,
450 Dauphin st., Mobile, Ala.
Orton, Ingomar F.,
13th st., Galveston, Tex.
Osgood, Hugh H.,
148 Main st., Norwich, Conn.
Osmun, Charles A.,
13 7th ave., New York, N. Y.
Otis, Clark Z.,
63 Court st., Binghamton, N. Y.
Ottinger, James J.,
20th & Spruce sts., Philadelphia, Pa.
Otto, John N. W.,
76 S. Rampart st., New Orleans, La.
Overstreet, William P.,
1624 15th st., Louisville, Ky.
Owens, James A.,
45 Dominick st., Rome, N. Y.
Owens, Richard J.,
Myrtle ave. & Spencer st., Brooklyn, N. Y.
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Parcher, George A.,
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Parisen, George W.,
Smith & High sts., Perth Amboy, N. J.
Parker, Arthur S.,
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Parker, George H.,
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Parker, Walter W.,
Main st., Henderson, N. C.
Parkill, Stanley E.,
Owosso, Shiawassee co., Mich.
Parr, John C.,
Main st., Weston, Mo.
Parrott, John E.,
Littleton, Halifax co., N. C.
Parsons, John,
194 31st st., Chicago, Ill.
Partridge, Charles K.,
Granite Block, Augusta, Me.
Patch, Edgar L.,
109 Green st., Boston, Mass.
Patten, I. Bartlett,
333 Washington st., Boston, Mass.
Patterson, Theodore H.,
3640 Cottage Grove ave., Chicago, Ill.
Pattison, Charles H.,
Grand Crossing, Ill.
Pattison, George H.,
7841 Eggleston ave.,Station P., Chicago, Ill.
Patton, John F.,
237 W. Market st., York, Pa.
Pauley, Frank C.,
Eastern st. & Compton ave., St. Louis, Mo.
Payne, George F.,
State Capitol, Atlanta, Ga.
Peabody, William H.,
8 S. Division st., Buffalo, N. Y.
Peacock, Josiah C.,
3909 N. 5th st., Philadelphia, Pa.
Pearce, Howard A.,
370 Elmwood ave., Providence, R. I.
Pease, Autumn V.,
Fairbury, Neb.
Pease, Francis M.,
Main st., Lee, Mass.
Peck, George L.,
Hall of Pharmacy, Jamaica, N. Y.
Peniston, Paul,
Palmetto, Ga.

Pennington, T. H. Sands,
14 2d st., Troy, N. Y.
Percy, William G.,
Brainerd, Minn.
Perham, Henry A.,
Main st., Lexington, Mass.
Perkins, Benjamin A.,
16 Pine st., Portland, Me.
Perkins, C. William,
297 Main st., New Britain, Conn.
Perkins, William A.,
84 S. C st., Virginia City, Nev.
Perot, T. Morris,
1810 Pine st., Philadelphia, Pa.
Perry, Frederick W. R.,
709 Woodward ave., Detroit, Mich.
Peter, Minor C.,
832 Sixth st., Louisville, Ky.
Petsche, Bismarck W.,
Arlington Chemical Co., Yonkers, N. Y.
PETTIT, HENRY M.,
15 S. Main st., Carrollton, Mo.
Peyton, Robert D.,
1317 4th ave., Louisville, Ky.
Pfafflin, Henry A.,
402 S. Delaware st., Indianapolis, Ind.
Pfeiffer, John,
241 Nostrand ave., Brooklyn, N. Y.
Pfiffner, Fritz J. R.,
38 N. Sandusky st., Delaware, O.
PFINGST, FERDINAND J.,
18th & Main sts., Louisville, Ky.
Pfunder, William,
1st & Ash sts., Portland, Oregon.
Phelps, Dwight,
337 Main st., West Winsted, Conn.
Phillimore, Fred. S.,
331 Hanover st., Boston, Mass.
Phillips, Carrie Elizabeth,
17 Wyeth st., Cambridge, Mass.
Phillips, Charles W.,
484 Eastern ave., Cincinnati, O.
Phillips, Edwin F.,
4 E. Main st., Armada, Mich.
Physick, Henry S.,
3104 Easton ave., St. Louis, Mo.
Pickett, John H.,
Oskaloosa, Mahaska co., Iowa.
Pieck, Edward L.,
6th & Main sts., Covington, Ky.
Pierce, William H.,
316 Shawmut ave., Boston, Mass.
Pile, Gustavus.
770 Passyunk ave., Philadelphia, Pa.
Pitt, John R.,
218 Main st., Middletown, Conn.
Plaut, Albert.
128 William st., New York, N. Y.
Pleasants, Charles H.,
61 West Houston st., New York, N. Y.
Plenge, Henry,
8 Broad st., Charleston, S. C.
Plummer, David G.,
6 Main st., Bradford, Stark co., Ill.
Plummer, Edward,
405 5th ave., New York, N. Y.
Plummer, Joseph W.,
504 Simonton st., Key West, Fla.
Porter, Chilton S.,
Somerset, Pulaski co., Ky.
Porter, Henry C.,
Main & Pine sts., Towanda, Pa.
Porter, Louis F.,
151 Winsor st., Cambridgeport, Mass.
Porter, Martin L.,
Danforth, Washington co., Me.
Porter, Millett N.,
3850 State st., Chicago, Ill.
Potter, William R.,
446 Broad st., Providence, R. I.
Potts, David G.,
24 S. 2d st., Philadelphia, Pa.
Powell, Robert B.,
2d & G sts., Eureka, Humboldt Bay, Cal.
Powell, Thomas W.,
10 Houston st., Fort Worth, Tex.
Power, Frederick B.,
29 Grove Terrace, Passaic, N. J.
Prall, Delbert E.,
111 S. Jefferson ave., Saginaw, Mich.
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Shelbyville, Ky.
Prentiss, John B.,
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Prescott, Horace A.,
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Preston, Andrew P.,
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Preston, David,
9th & Lombard sts., Philadelphia, Pa.
Price, Charles H.,
226 Essex st., Salem Mass.

Price, Joseph,
226 Essex st., Salem, Mass.
Prieson, Adolph,
Main & Vesper sts., Lock Haven, Pa.
Probeck, George J.,
223 Detroit st., Cleveland, O.
Procter, Wallace.
1900 Pine st., Philadelphia, Pa.
Puckner, William A.,
465 State st., Chicago, Ill.
Punch, William F.,
71 Dauphin st., Mobile, Ala.
Purcell, Nicholas S.,
King st., Leesburgh, Va.
Pursell, Howard,
Mill & Cedar sts., Bristol, Pa.
Pyle, Cyrus,
88 Warren st., New York, N. Y.
Quackinbush, Benjamin F.,
703 Greenwich st., New York, N. Y.
Quandt, Arthur A.,
124 S. Howard st., Baltimore, Md.
Quandt, Ernest E.,
124 S. Howard st., Baltimore, Md.
Qvale, Victor A.,
Rochester, Minn.
Rademaker, Herman H.,
801 E. Madison st., Louisville, Ky.
Radford, Reuben L.,
129 Main st., Henderson, Ky.
Rains, A. Brown,
11 W. 7th st., Columbia, Tenn.
Ramsperger, Gustavus,
236 E. 23d st., New York, N. Y.
Rand, Daniel M.,
Main & Depot sts., S. Windham, Me.
Randall, Frank O.,
101 N. Main st., Brockton, Mass.
Rano, Charles C.,
1872 Niagara st., Buffalo, N. Y.
Rapelye, Charles A,,
325 Main st., Hartford, Conn.
Rauschkolb, John,
251 S. 4th st., Columbus, O.
Ray, Frederick E.,
901 K st., Sacramento, Cal.
Ray, Peter W.,
379 S. 2d st., Brooklyn, N. Y.
Raymond, Harry L.,
833 Massachusetts st., Lawrence, Kan.
Raynale, Frank B.,
Residence unknown.
Read, Albert M.,
1140 15th st., N. W., Washington, D. C.
Redsecker, Jacob H.,
810 Cumberland st., Lebanon, Pa.
Reed, Charles C.,
111 Kickosoo st., Lincoln, Ill.
Reed, James,
302 S. 6th st., Nebraska City, Neb.
Reed, Willoughby H.,
Marshall & Astor sts., Norristown, Pa.
Reichardt, F. Alfred,
Residence unknown.
Reidy, Michael,
Shiawassee ave., Corunna, Mich.
REMINGTON, JOSEPH P.,
1832 Pine st., Philadelphia, Pa.
Renz, Frederick J.,
Market & Floyd sts., Louisville, Ky.
Reynolds, Howard P.,
Park & North aves., Plainfield, N. J
Reynolds, John J.,
Water & Main Cross sts., Flemingsburg, Ky.
Reynolds, William K.,
354 Friendship st., Providence, R. I.
Rhode, Rudolph E.,
504 N. Clark st., Chicago, Ill.
Rice, Charles,
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Rich, Willis S.,
166 Union st., Olean, N. Y.
Richardson, Horatio S.,
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Richter, Gustave A.,
801 S. Front st., Philadelphia, Pa.
Riddell, Benjamin F.,
8 Granite Block, Fall River, Mass.
Ridgway, Lemuel A.,
Eastern Chemical Co., Versailles, Conn.
Riesenman, Joseph,
1266 Liberty st., Franklin, Pa.
Riggs, William E.,
Fairfield, Clay co., Neb.
Riley, Charles W.,
1343 N. 13th st., Philadelphia, Pa.
Rittenhouse, Henry N.,
1705 N. 17th st., Philadelphia, Pa.
Rives, Edward B.,
56 N. Main st., Los Angeles, Cal.
Robbins, Alonzo,
11th & Vine sts., Philadelphia, Pa.
Robert, William H., Jr.,
431 W. Main st., Denison, Tex.

Roberts, Daniel J.,
Peabody, Marion co., Kan.
Robertson, Felix O.,
Searcy, White co., Ark.
Robin, Oscar,
249 St. Ann st., New Orleans, La.
Robins, Wilbur F.,
28 Main st., Littleton, N. H.
Robinson, Edward A.,
19 Warwick st., Lowell, Mass.
Robinson, Ernest F.,
832 Yonge st., Toronto, Can.
ROBINSON, JAMES S.,
2d & Madison sts., Memphis, Tenn.
Robinson, William A.,
49 Drummond st., Auburn, Me.
Rockefeller, Lucius,
Palisade ave., Englewood, N. J.
Rogers, Arthur H.,
Geneseo, Livingston co., N. Y.
Rogers, Wiley,
15th & Chestnut sts., Louisville, Ky.
Rogers, William H.,
North st., Middletown, N. Y.
Rohde, Claus F.,
Waterville, Minn.
Rollins, John F.,
Fort George, Duval co., Fla.
ROSENGARTEN, MITCHELL G.,
17th & Fitzwater sts., Philadelphia, Pa.
Rosenthal, David A.,
Gay & Depot sts., Knoxville, Tenn.
Rosewater, Nathan,
111 Water st., Cleveland, O.
Ross, Samuel P.,
Liberty ave. & McKee st., Houston, Tex.
Rowlinski, Robert A.,
104 Broughton st., Savannah, Ga.
Royston, Oliver M.,
Hickory, N. C.
Ruddiman, Edsel A.,
Vanderbilt Univ., Nashville, Tenn.
Rudolf, Eliza,
Dryades & 2d sts., New Orleans, La.
Ruenzel, Henry G.,
753 3d st., Milwaukee, Wis.
Ruete, Theodore W.,
568 Main st., Dubuque, Iowa.
Runyon, Edward W.,
234 Sutter st., San Francisco, Cal.
Ruppert, John,
Pine Hill, Cincinnati, O.
Rusby, Henry H.,
222 W. 132d st., New York, N. Y.
Russell, Dorian M.,
166 W. Bridge st., Grand Rapids, Mich.
Russell, Eugene J.,
Army st. & Canton ave., Baltimore, Md.
Rust, William,
7 Peace st., New Brunswick, N. J.
Ryan, Frank G.,
145 N. 10th st., Philadelphia, Pa.
Sadtler, Samuel P.,
204 N. 34th st., Philadelphia, Pa.
Sample, Ellmer W.,
31 N. Second st., Ironton, O.
SANDER, ENNO,
129 S. 11th st., St. Louis, Mo.
Sanderson, Stephen F.,
828 Nicollet ave., Minneapolis, Minn.
Sargent, Ezekiel H.,
125 State st., Chicago, Ill.
Sargent, Jesse W.,
252 Pleasant st., Malden, Mass.
Sauer, Louis W.,
927 Central ave., Cincinnati, O.
Sauerhering, Rudolph A.,
Main st., Mayville, Dodge co., Wis.
Saunders, William,
Central Experim. Farm, Ottawa, Can.
Sautter, Louis,
S. Pearl & Plain sts., Albany, N. Y.
Sawyer, Willey W.,
426 E. State st., Rockford, Ill.
Sawyer, William F.,
1152 Tremont st., Boston, Mass.
Sayre, Edward A.,
Seabury & Johnson, New York, N. Y.
Sayre, Lucius E.,
University of Kansas, Lawrence, Kan.
Sayre, William H.,
Warner & Orange sts., Newark, N. J.
Schafer, George H.,
713 Front st., Fort Madison, Iowa.
Schafhirt, Adolph J.,
1st & H sts., Washington, D. C.
Scheffer, Emil,
173 Shelby st., Louisville, Ky.
Scheffer, Henry W.,
Care of Larkin & Scheffer, St. Louis, Mo.
Schellentrager, Ernst A.,
725 St. Clair st., Cleveland, O.
Scherer, Andrew,
383 N. State st., Chicago, Ill.

Scherff, John P.,
Glenwood & Wash'tn aves., Bloomfield, N. J.
Scherling, Gustav,
1201 4th st., Sioux City, Ia.
Schieffelin, William J.,
170 William st., New York, N. Y.
Schiemann, Edward B.,
M & Walnut sts., Louisville, Ky.
Schimpf, Henry W.,
365 Franklin ave., Brooklyn, N. Y.
Schlaepfer, Henry J.,
Main & 2d sts., Evansville, Ind.
Schley, Steiner,
16 W. Patrick st., Frederick City, Md.
Schlotterbeck, Julius O.,
17 S. Ingalls st., Ann Arbor, Mich.
Schmid, Henry,
38 Ave. A, New York, N. Y.
Schmidt, Carl,
1871 Pearl st., Brooklyn Village, O.
Schmidt, Ferdinand T.,
86th st. & Amsterdam ave., New York, N. Y.
Schmidt, Florian C.,
71st st. & Cottage Grove ave., Chicago, Ill.
Schmidt, Frederick M.,
1107 Schiller Building, Chicago, Ill.
Schmidt, Valentine,
Polk & Jackson sts., San Francisco, Cal.
Schmitt, George J. F.,
507 W. Commerce st., San Antonio, Tex.
Schmitt, Joseph M.,
312 North st., Rochester, N. Y.
Schmitter, Jonathan,
Maple st., Gypsum City, Saline co., Kan.
Schoenhut, Christie H.,
199 Superior st., Cleveland, O.
Schoettlin, Albert J.,
4th & Chestnut sts., Louisville, Ky.
Scholtz, Edmund L.,
16th & Stout sts., Denver, Col.
Schotel, John C.,
Railroad ave., Gloster, Amite co., Miss.
Schrader, Herman v. R.,
Tallahassee, Fla.
Schrank, C. Henry,
437 E. Water st., Milwaukee, Wis.
Schueller, Ernst,
281 S. High st., Columbus, O.
Schueller, Frederick W.,
232 S. High st., Columbus, O.
Schuh, Paul G.,
607 Commercial ave., Cairo, Ill.
Schulze, Louis,
631 S. Patterson Park ave., Baltimore, Md.
Schurk, Louis,
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Schwab, Leslie W.,
460 E. 41st st., Chicago, Ill.
Schweickhardt, Richard,
Main & Ervay sts., Dallas, Tex.
Scott, Alex. W.,
Mountain ave., Fort Collins, Col.
Scott, Frank G.,
36 Euclid ave., Cleveland, O.
Scott, George T.,
Franklin Square, Worcester, Mass.
Scott, J. McDonald,
381 W. Van Buren st., Chicago, Ill.
Scott, William H.,
1617 17th st., Richmond, Va.
Scoville, Charles H.,
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Scoville, Wilbur L.,
St. Botolph & Garrison sts., Boston, Mass.
SEABURY, GEORGE J.,
59 Maiden Lane, New York, N. Y.
Searby, William M.,
400 Sutter st., San Francisco, Cal.
Sedberry, Bond E.,
Market Square, Fayetteville, N. C.
Seifert, Charles A.,
German Hospital, San Francisco, Cal.
Seitz, Oscar,
104 N. Santa Fe ave., Salina, Kan.
Selzer, Eugene R.,
1492 Superior st., Cleveland, O.
Sempill, Walter M.,
135 Clark st., Chicago, Ill.
Sennewald, Ferdinand W.,
800 Hickory st., St. Louis, Mo.
Serodino, Herman,
53 Observatory st., Cincinnati, O.
Sevin, N. Douglas,
141 Main st., Norwich, Conn.
Shafer, Erwin C.,
Green Lane & York Road, Philadelphia, Pa.
Shake, Homer C.,
125 Oliver ave., W. Indianapolis, Ind.
Shannon, Thomas R.,
143 Trumbull st., Hartford, Conn.
Sharp, Alpheus P.,
Pratt & Howard sts., Baltimore, Md.
Sharp, Harry,
Junc. Marietta & Walton sts., Atlanta, Ga.

Sharples, Stephen P.,
13 Broad st., Boston, Mass.
Shaw, Robert J.,
3 E. Front st., Plainfield, N. J.
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Shelton, William C.,
Residence unknown.
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1513 Dodge st., Omaha, Neb.
Sherrard, Charles C.,
121 20th st., Detroit, Mich.
Sherwin, Eugene A.,
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Sherwood, Henry J.,
979 Woodward ave., Cleveland, O.
Sherwood, Louis W.,
45 W. Broad st., Columbus, O.
Shinn, James T.,
Broad & Spruce sts., Philadelphia, Pa.
Shoemaker, Richard M.,
4th & Race sts., Philadelphia, Pa.
Shreve, John A.,
Main st., Port Gibson, Miss.
Shriver, Henry,
53 Baltimore st., Cumberland, Md.
Shryer, Thomas W.,
111 Baltimore st., Cumberland, Md.
Shultz, Merriken E.,
106 N. 5th st., Beatrice, Neb.
Shurtleff, Israel H.,
39 Elm st., New Bedford, Mass.
Siegemund, Charles A.,
26 Tremont st., Boston, Mass.
Siegenthaler, Harvey N.,
22 E. High st., Springfield, O.
Sieker, Ferdinand A.,
128 William st., New York, N. Y.
Siekman, Ivan F.,
75 S. Rampart st., New Orleans, La.
Simmon, Karl,
7th & Sibley sts., St. Paul, Minn.
Simms, Giles G. C.,
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Simon, William,
1348 Block st., Baltimore, Md.
Simons, Arthur H.,
Conneaut, Ashtabula co., O.
Simonson, William,
9th & Race sts., Cincinnati, O.
Simpson, William,
101 Fayettesville st., Raleigh, N. C.
Simson, Francis C.,
Pentagon Bdg., Halifax, N. S.
Simson, William A.,
Care Simson Bros. & Co., Halifax, N. S.
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22 W. Washington st., Indianapolis, Ind.
Slocum, Frank L.,
170 Rebecca st., Allegheny, Pa.
Smink, Robert W.,
309 W. Spruce st., Shamokin, Pa.
Smink, William H. R.,
33 Market st., Shamokin, Pa.
Smith, B. Frank,
2600 Indiana ave., Chicago, Ill.
Smith, Charles B.,
861 Broad st., Newark, N. J.
Smith, Clarence P.,
863 Broad st., Newark, N. J.
Smith, Edward N.,
95 Main st., Thompsonville, Conn.
Smith, Edward S.,
Main st., Port Henry, N. Y.
Smith, Frank R.,
5th & King sts., Wilmington, Del.
Smith, Frank T.,
Franklin, Macon co., N. C.
Smith, George S.,
Liberal, Seward co., Kan.
Smith, J. Hungerford,
19 Elm st., Rochester, N. Y.
Smith, James P.,
1776 Broad st., Augusta, Ga.
Smith, Joseph S.,
Akron, O.
Smith, Lauriston S.,
King st., St. Augustine, Fla.
Smith, Linton,
Church & Bennett sts., Wilmington, Del.

Smith, Linville H.,
701 Centre st., Jamaica Plain, Mass.
Smith, Reuben R.,
98 9th ave., New York, N. Y.
Smith, Samuel W.,
182 Main st., Ansonia, New Haven co., Conn.
Smith, Theodric,
1343 Pennsylvania ave., Baltimore, Md.
Smith, Thomas E.,
252 Beauregard st., Mobile, Ala.
Smith, Whitefoord G.,
31 Patton ave., Asheville, N. C.
Smith, Willard A.,
Main st., Richfield Springs, N. Y.
Smith, William C.,
14th & Market sts., Oakland, Alameda co., Cal.
Smithson, David E.,
Caldwell, Canyon co., Idaho.
Sniteman, Charles C.,
Neillsville, Clark co., Wis.
Snow, Charles W.,
214 Warren st., Syracuse, N. Y.
Snow, Herbert W.,
15th & Farnam sts., Omaha, Neb.
Snyder, Alva L.,
33 Court Square, Bryan, O.
Snyder, Ambrose C.,
13½ St. Felix st., Brooklyn, N. Y.
Snyder, Robert J.,
2d & Market sts., Louisville, Ky.
Soetje, Edward C.,
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Sohn, Frank,
Grand & Easton aves., St. Louis, Mo.
Sohrbeck, G. Henry,
3d ave. & 16th st., Moline, Ill.
Solomons, Isaiah A.,
Savannah, Ga.
Sombart, John E.,
El Reno, Oklahoma.
Sords, Thomas V.,
315 Pearl st., Cleveland, O.
Spalding, Warren A.,
89 Church st., New Haven, Conn.
Spangler, Henry W.,
Perry, Jefferson co., Kan.
Sparks, James M.,
718 Garrison ave., Fort Smith, Ark.
Spengler, John G.,
2d & Webster sts., Dayton, O.
Spenzer, Peter I.,
370 Central ave., Cleveland, O.
Sperry, Herman J.,
151 Chapel st., New Haven, Conn.
Squibb, Edward H.,
36 Doughty st., Brooklyn, N. Y.
Squibb, Edward R.,
36 Doughty st., Brooklyn, N. Y.
Squires, George B.,
109 Green st., Boston, Mass.
Stacey, Benjamin F.,
Thompson Square, Charlestown, Mass.
Staebler, Richard,
848 Broad st., Newark, N. J.
Stahler, William,
Main & Swede sts., Norristown, Pa.
Stahlhuth, Ernst H. W.,
5th & Washington sts., Columbus, Ind.
Stam, Colin F.,
Chestertown, Kent co., Md.
Stamford, William H.,
256 Mulberry st., Newark, N. J.
Stanley, Edgar C.,
97 Franklin st., Auburn, N. Y.
Stark, Harry,
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Staudt, Louis C.,
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Stebbins, Harry F.,
Cor. Wilton & 23d sts., Denver, Colo.
Stedem, Frederick W. E.,
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Main & Prospect sts., Thompsonville, Conn.
Steele, James G.,
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King st., Garrett, Ind.

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Sweet, Caldwell,
22 W. Market Square, Bangor, Me.
Tailby, Joseph A.,
Linden st., Wellesley, Mass.
Tanke, Ernst J.,
117 Wells st., Chicago, Ill.
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39 Johnston st., Newburg, N. Y.
Taylor, Alfred B.,
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Taylor, George A.,
42 Railroad st., Methuen, Mass.
Taylor, John P.,
99 3d st., New Bedford, Mass.
Taylor, Thomas L.,
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Taylor, Walter T.,
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Thatcher, Hervey D.,
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139 Main st., Hartford, Conn.
Trautmann, Ludwig,
Wabasha, Minn.
Travis, J. Walton,
59 Fairfield ave., Bridgeport, Conn.
Travis, Miles B.,
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Walker, Charles W.,
171 E. Haverhill st., Lawrence, Mass.
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Warner, William R.,
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Warren, Edwin A.,
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Warren, William M.,
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Washburn, Harry M.,
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137 Richardson st., Atlanta, Ga.
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Care Clinton Pharm. Co., Syracuse, N. Y.
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Wells, Edwin H.,
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Wendle, Henry E.,
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Wenzell, William T.,
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Westmann, Frank H.,
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122 Water st., Exeter, N. H.
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New Canaan, Conn.
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Wood, Edward S.,
14 Chauncey st., Cambridge, Mass.
Wood, George M.,
20 Broad st., Bloomfield, N. J.
Wood, James P.,
2 Church st., New Haven, Conn.
Wood, Mason B.,
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Woodman, Walter I.,
St. Augustine, Fla.
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Woods, Silas E.,
Jackson, Mo.
Wooldridge, Daniel T.,
9 Morgan st., Boonville, Mo.
Woolley, Stephen D.,
Asbury Park, N. J.
Wooten, Thomas V.,
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P. O. Box 721, Yonkers, N. Y.
Wright, Albert F.,
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Wright, Arthur W.,
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Wulling, Frederick J.,
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Wunderlich, Edward,
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Wurmb, Theodore H.,
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Wyckoff, Elmer E.,
506 22d st., Rock Island, Ill.
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123 E. Main st., Durham, N. C.
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Chariton, Lucas co., Ia.
YORSTON, MATTHEW M.,
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Young, Hiram W.,
Main st., Marion, Kans.
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114 Park ave., Rich Hill, Mo.
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Ziegler, Philip M.,
526 Penn st., Reading, Pa.
Zimmer, Harry E.,
78 E. Washington st., Indianapolis, Ind.
Zimmermann, Albert,
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Zimmermann, Charles,
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Zoeller, Edward V.,
Main st., Tarboro, N. C.
Zuenkeler, J. Ferd.,
686 Vine st., Cincinnati, O.
Zwick, George A.,
11th st. & Madison ave., Covington, Ky.

LIST OF RESIGNATIONS.

Angell, Richard.
Aspinall, Walter A.
Brooks, Claude M.
Brunswig, Lucien W.
Catlin, Ephron.
De Graff, David.
Finn, Thomas.
Hall, Marshall C.
Heller, George S.
Illsley, Geo. W. B.
Koenigstein, Daniel J.
Lammert, C. Joseph.
Mattison, Thomas C.
Morris, Wm. S.
Pfingsten, Gustavus.
Poehner, Adolph A.
Reynolds, Chas. E.
Roberts, Wm.
Schaap, John.
Schreck, Leo S.
Smith, Amasa D.
Weaver, John A.

LIST OF DECEASED MEMBERS.

Alfreds, Henry J.,	Providence, R. I.,	Elected	1883
Bentley, Robert (Honorary),	London, England,	"	1872
Burnett, Joseph,	Boston, Mass.,	"	1852
Bush, William,	Worcester, Mass.,	"	1875
Colcord, Samuel M.,	Dover, Mass.,	"	1852
Dadd, John A.,	Milwaukee, Wis.,	"	1880
Drake, Chas. W.,	Middleboro, Mass.,	"	1873
Flückiger, F. A. (Honorary),	Berne, Switzerland,	"	1868
Goodman, Chas. F.,	Omaha, Neb.,	"	1871
Jones, Samuel S.,	Wilkesbarre, Pa.,	"	1887
Knœfel, August,	New Albany, Ind.,	"	1879
Krosscop, Wm. B.,	Oil City, Pa.,	"	1887
Lauranson, Louis,	Memphis, Tenn.,	"	1894
Lyneman, F. A.,	Denver, Colo.,	"	1892
Maclagan, Henry,	New York, N. Y.,	"	1883
Martin, Hugo W. C.,	Chicago, Ill.,	"	1881
Metcalf, Theodore,	Boston, Mass.,	"	1857
Munson, Jas. H.,	Philadelphia, Pa.,	"	1889
Pfingst, Edward C.,	Louisville, Ky.,	"	1874
Prentice, Fred. F.,	Janesville, Miss.,	"	1876
Ryan, Henry,	Taftville, Conn.,	"	1892
Schumann, Theodore,	Atlanta, Ga.,	"	1860
Thompson, Wm. Silver,	Baltimore, Md.,	"	1856

LIST OF MEMBERS DROPPED FROM THE ROLL FOR NON-PAYMENT OF DUES, ACCORDING TO CHAPTER VIII., ARTICLE III., OF THE BY-LAWS.

(Published in accordance with Resolution Adopted at Asheville, N. C., September, 1894.)

Babin, John E.
Bailey, Alexander C.
Bain, Andrew W.
Beckwith, Edmund R.
Birchfield, Wellington W.
Brown, James.
Carter, George F.
Connor, L. Myers.
Even, Charles,
Fisher, William.
Francis, Walter R.
Godding, Edward R.
Grigsby, Robert L.
Hahn, Sigisimund J. F.
Haenstgen, H. Otto.
Heilman, Russell P.
Hughes, George.
Hughes, James W.
Inman, Chas. F.
Keller, Fred. P. P.
Knapp, Frank F.
Kuhlmeier, Henry.
Lehman, John W.
Miller, Charles G.
Mitchell, Edward T.
Nicholson, William S.
Norton, Edward B.
Price, Charles A.
Rumsey, Samuel L.
Seeman, Charles F.
Shell, James L.
Simpson, Robert.
Stevens, Luther F.
Stone, Clarence G.
Turner, Isaac W.
Willis, John B.
Yeager, Alvin A.

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